Railway Age Gazette

FIRST HALF OF 1917 No. 4 SIXTY-SECOND YEAR

CLEVELAND NEW YORK—JANUARY 26, 1917—CHICAGO WASHINGTON

KERITE

JAN 29 1917
UNIV. OF MICH
LIB

Another year added to the
PERFORMANCE RECORD OF KERITE

KERITE INSULATED WIRE & CABLE COMPANY
NEW YORK CHICAGO

Alphabetical Index to Advertisements, Page 5

Classified Directory of Advertisers, Page 6

CHASE GOAT BRAND PLUSHES AND CHASE IMITATION LEATHER

Quality standards are fixed and dependable

Several months ago a seat cover of Chase Plush was sent to us with the statement that it had been in continual service for twenty-four years.

L. C. CHASE & CO.

89 Franklin Street, BOSTON. 326 W. Madison Street, CHICAGO. 321 Fourth Avenue, NEW YORK. 303 Majestic Bldg., DETROIT.

GOLD CAR HEATING & LIGHTING CO.

ECONOMICAL—SYSTEMS OF MERIT—WILL NOT FREEZE

VAPOR SYSTEMS | PRESSURE SYSTEMS | VAPOR AND PRESSURE SYSTEMS | HOT WATER SYSTEMS | ELECTRIC SYSTEMS

AUTOMATIC HEAT CONTROL FOR ALL SYSTEMS—VENTILATORS

17 BATTERY PLACE, NEW YORK

Trunking and Capping
Car Siding and Roofing
Ties and Cross Arms

Inquiries Solicited

Louisiana Red Cypress Co.

New Orleans La.

DICKINSON DEVICES

Cast Iron Smoke Jacks
Light Fire-Proof Smoke Jacks
Ventilators All Materials
Cast Iron Chimneys
Cast Iron Buildings
Telephone Booths

PAUL DICKINSON Inc., 3354 South Artesian Ave., Chicago

SARCO MINERAL RUBBER ASPHALTS

SARCO No. 6 Waterproofing
SARCO Bituminous Putty
SARCO 5-M Paint
SARCO Refrigerator Compound
SARCO Mineral Rubber Floors
SARTAC-Damp-Proofing
SARCO R. S. A. Specifications
SARCO Roof Cement

SARCO PRODUCTS INSURE PURITY AND RELIABILITY

Promptness—Service—Efficiency

SARCO STANDARD ASPHALT & RUBBER CO. SARCO
CHICAGO, ILL.

Specify **BUCKEYE JACKS**

and be assured that you are getting the best jack in design, capacity and longevity that is manufactured

Send for Catalogue

BUCKEYE JACK MFG. CO. ALLIANCE OHIO

TIE PLATES *Send for Catalogue*

MANUFACTURED FROM NEW STEEL BILLETS
WORKMANSHIP AND MATERIAL GUARANTEED

THE RAILROAD SUPPLY COMPANY

BEDFORD BUILDING, CHICAGO

WYCKOFF PIPE AND CREOSOTING CO., Inc.
Established 1881.
Send for Catalogue "H."
30 East 42d St., New York.

WYCKOFF TREATED TIES
WILL NOT DECAY

Piles,
Paving Blocks,
Conduits, Signal
Posts, Signal Wire
Casings, Steam Pipe Casings,
Wood Pipe, and all forms of creosoted wood.

Creosoting Works and Factory: PORTSMOUTH, VA.

SNOW PLOWS AND FLANGERS

Also single and double truck caboose cars for steam railway service.

RUSSELL CAR & SNOW PLOW CO.,
Ridgway, Pa.

Eastern Agents
Wendell & MacDuffie
61 Broadway, New York City

Western Agents
The M-C-B COMPANY
McCormick Bldg., Chicago

FRANK B. STONE
TIMBER, LUMBER, PILING, TIES,
OAK, FIR, YELLOW PINE.
RAILWAY EXCHANGE, CHICAGO.

FOR elevators, dredges, lumbering, mining, oil-well drilling, suspension bridges, stump-pulling, cranes, derricks, ships' rigging and every other form of wire rope use.

Ask for illustrated catalogue

American Steel & Wire Company

Chicago New York Cleveland Pittsburgh Worcester Denver

Export Representative: U. S. Steel Products Co., New York

Pacific Coast Representative: U. S. Steel Products Co.
San Francisco Los Angeles Portland Seattle

Better Observance of Signals Is Obtained By Using Cab Signals

As developed in connection with the Simmen System, cab signals are practical, reliable, low in first cost and maintenance cost, and adaptable to a variety of traffic conditions.

Simmen Automatic Railway Signal Co.
1575 Niagara Street
Buffalo, N. Y.

Write for our booklet "Progressive Signaling"

Railway Age Gazette

Volume 62 January 26, 1917 No. 4

Table of Contents

EDITORIALS:

Car Shortage Decreasing Faster Than in 1907 125
They Do Not Want an Eight Hour Day 125
Financing by the Sale of Stock 125
Regulation by Hold-up 126
The Commission Prescribes Car Service Rules 126
The Increase in Freight Car Efficiency 127

LETTERS TO THE EDITOR:

Coal Prices and Car Shortage; F. J. Lisman 128
The Menace of Labor Unionism; Wilbur Gordon 128

MISCELLANEOUS:

*The Maintenance of Electric Locomotives 129
*Louisville & Nashville Expands Absolute-Permissive Signaling 134
I. C. C. Prescribes Partial Code of Car Service Rules 135
Kansas City Southern Protests Against Tentative Valuation 139
*Virginian Triplex Type Pusher Locomotive (With Insert) 141
*Washington Correspondence 143
*Statistics Show Increase of Freight Car Efficiency 145
A Boiler Metal Treatment 148
*Motor Car for Mountain Service 148
Convention of Wood Preservers' Association 149
GENERAL NEWS SECTION 154

* Illustrated.

The statement of net car shortage for December 31, recently issued by the American Railway Association, is significant when considered in connection with the car shortage period of 1906-7. Although no records were kept by the association in 1906, it is generally believed that the shortage in the fall and winter of that year was relatively as severe as that of 1916. The records for 1907 show a marked increase in net shortage in the first two months of the year, as evidenced by the statistics for January 2, when the net shortage was 85,493 cars and for February 6, when it was 137,847 cars. The A. R. A. reports show a continued net shortage throughout the first half of that year. Records for 1916 indicate that the efforts of the railroads to cope with the problem of car supply have been more successful than they were 10 years before. The peak shortage was recorded on November 1, being 114,908 cars; on December 1, it had been reduced to 107,778 cars, and on December 31, it was reduced almost one-half to 59,892 cars. If similar progress continues to be made, the shortage will be wiped out three or four months earlier than it disappeared in 1907.

Car Shortage Decreasing Faster Than in 1907

At a hearing before the House Committee on Interstate and Foreign Commerce last Friday on labor legislation proposed by the President, Chairman Adamson announced that the committee would give no further consideration to that section of the bill limiting the working hours of train employees to eight except as permitted by the Interstate Commerce Commission. Mr. Adamson said that the section had been introduced for a purpose which had been served. He did not say what the purpose was, but if the idea was to smoke out the attitude of the brotherhood leaders toward a real eight-hour day it was completely successful. The brotherhoods have been very anxious to have the public and the President believe that they wanted an eight-hour day, whereas railway officers understood perfectly well that their principal purpose was to obtain the large increases in wages which would result from the adoption of the eight-hour basic day which they demanded. The Adamson law passed last summer providing for an increase in wages has become a very uncertain proposition. Therefore, when Mr. Adamson introduced a new bill limiting the working hours to eight on the ground of safety, but without any provision for an increase in wages, the leaders of the brotherhoods lost no time in jumping on it with both feet, pronouncing a real eight-hour day in railroad service impracticable and asking Congress to keep its hands off the situation.

They Do Not Want an Eight-Hour Day

The New York Central is offering at par to its stockholders $25,000,000 treasury stock. This offering is not underwritten, so that should the stockholders fail to subscribe for all or any large proportion of the stock, the railroad company would be left with the stock on its hands; in other words, its attempt to raise money in this way would prove a failure. New York Central stock is paying 5 per cent dividends and is selling in the neighborhood of 101 to 102. Right to subscribe to the new stock expires February 5. It has been held by many bankers that only the very strongest railroad companies could within recent years finance their needs through the sale of stock, and then only by offering the stock to stockholders at a price substantially below that at which the old stock was selling in the market. If the New York Central offer proves successful, and if all or the greater part of the stock is taken by stockholders, it would be strong evidence that in the present money market some railroads at least can sell stock at a price not much below the market quotations. Recently the Chicago & North Western began applying to the various state commissions, whose approval was necessary, for authority to issue $15,250,950 stock. In December, 1915, the Atchison, Topeka & Santa Fe sold $10,000,000 5 per cent preferred stock through J. P. Morgan & Co. at 98½. It is quite conceivable that because of the great abundance of investment funds in the United States at present, and notwithstanding the attractive interest yields which are attached to foreign government offerings of bonds, American railroad stocks

Financing by the Sale of Stock

of the highest grade of dividend earning roads could be sold at fair prices. It is probable that most investment bankers would tell you today that if they were certain that railroad regulation would be fair over a period of the next 10 or 15 years, they would have no hesitation in recommending many of the better railroad stocks to their customers.

REGULATION BY HOLD-UP

ONE of the most flagrant cases of injustice to which the railroads are subjected in these days of multiple regulation, arises from situations where the public, as the grantor of concessions required by the railways for the extension of their facilities, takes advantage of its position to hold up the petitioner for the last possible dollar that can be squeezed out, not necessarily as actual money paid over to the municipality, but more often in the form of extravagant expenditures designed to please the local public rather than to enhance the value of the property as a common carrier or to benefit the entire public it serves. In fact, legislatures and city councils seem never to be concerned in the least with the effect of these enormous and unnecessary expenditures on the cost of transportation.

This condition cannot be illustrated better than by the attitude of the city of Chicago toward the Illinois Central in the negotiations now pending between the city and the railroad. As previously outlined in these columns, the latter is requesting authority for the construction of a new passenger terminal and the granting of certain concessions which will permit the extension of its track facilities. The city has assumed the role of Shylock and must have its pound of flesh. The Illinois Central has presented plans for a passenger station of ample proportions and appropriate design and for the electrification of its suburban service. But this is not enough; the city must have plans for the complete electrification of all train service and switching movements, or nothing. The city apparently is not concerned with the problem of financing the enormous outlay involved, or with the difficulties which the wholesale change in power imposes on those who must carry out the work—and who later must operate the re-equipped line under the exceedingly complex terminal conditions.

The underlying fact in the present case is that the politicians of Chicago have raised a cry for electrification. The report of a commission on this subject issued about a year ago, after several years of careful investigation, satisfied the business interests of the city that an immediate and general change to electric power would be unwise because of the enormous burden which the necessary investment would place on all traffic in and out of the city. The agitators, however, remained undaunted and for lack of argument have resorted to force. The Illinois Central has been singled out for the initial project, not because it is best adapted to the experimental efforts or because conditions are such as to most urgently demand the change of power on this road, but because the city is in a position to conduct a piece of particularly sharp bargaining with this company.

That this policy is not restricted to the Illinois Central is indicated by a resolution offered recently in the city council to the effect that no concessions for increased terminal facilities be granted to any of the roads now using the La Salle, Dearborn, or Grand Central stations in Chicago unless the roads "co-operate" on a plan for electrification. The net result of this policy, as in the case now in hand, will be an unending series of delays while the existing facilities become more and more inadequate for the increasing traffic.

The change from steam to electric power throughout the entire Chicago terminals would be an undertaking of gigantic proportions, the plans for which should be worked out with painstaking care. That the rule of expedience rather than reason should enter into the determination of the first steps in this great work is obviously wrong. The electrification of the Illinois Central's suburban trains would seem to constitute a reasonable and legitimate beginning. The selection of the next important step ought to be governed by other considerations than those which have been brought to bear in the present negotiations.

THE COMMISSION PRESCRIBES CAR SERVICE RULES

THE report of the Interstate Commerce Commission on its car supply investigation and the special report of three members of the Car Service Commission, abstracts of which are published elsewhere in this issue, make unusually interesting reading.

After having recommended to Congress only a few weeks ago that it be given power to prescribe rules governing the interchange of cars, and after half a dozen bills have been introduced in Congress for the purpose, the Interstate Commerce Commission has suddenly decided, with three commissioners dissenting, to take the matter into its own hands and to act as if it had the power any way. However, whether or not the commission is justified in exercising what Commissioner Clark refers to as "a power which it has not only never before felt it had but which it has several times said it did not have," the fact remains that the railways are not in a very good position to object to the course which has been adopted.

The roads, through the American Railway Association, have adopted car service rules, some of which for years have been more honored in the breach than in the observance, and at the meeting of the American Railway Association on November 15 they adopted new rules and gave the Commission on Car Service power, with the approval of the executive committee, to further add to or modify them to meet emergencies. These rules have to a very considerable extent been disregarded by the railways and many of them have paid little or no attention to the recommendations and requests of the Commission on Car Service made for the purpose of handling the situation in the interest of all concerned.

While many roads have complied with these emergency recommendations at a considerable sacrifice to themselves, the number of roads that have failed to do their share to meet the situation with which the roads as a whole have been confronted has been so large and the misuse of cars has been so flagrant that several roads, as well as the representatives of the shippers, have appealed to the Interstate Commerce Commission to issue an order.

Although the Car Service Commission asked the Interstate Commerce Commission not to issue such an order until its new rules could be given a further trial, the commission has done so, principally for the purpose of putting into effect, subject to a drastic penalty for violation, rules very similar to those which the roads have heretofore shown themselves unable to enforce.

Commissioner Clark in his dissenting opinion points out that the interpretation placed by the majority upon the law and the powers which it confers upon the commission is at variance with all the interpretations heretofore adopted by the commission. He also thinks that the record has not furnished sufficient basis for finding either that the present car service rules are unreasonable or that the modifications of them ordered by the commission are reasonable. It may also be observed that the majority report of the commission makes no mention of the fact that the car shortage on December 31 had been reduced to less than 60,000, or about 50 per cent of the shortage on November 1. This would indicate that the work of the Car Service Commission has already shown some results and that considerable progress has been made

in getting cars out of the congested districts into the territory where they are most needed.

Recent developments regarding the freight car situation have again taught a lesson which the railways of the United States have been extremely slow to learn, and which, in fact, experience indicates they may never learn. This is, that they must deal fairly with one another and effectively police themselves, or the regulating authorities will step in and do the policing for them. The experience the roads are having with car service matters is merely a repetition of the experience they have had with other matters. In the days when secret rebating and other forms of unfair discrimination were rife the executive officers used to meet at short intervals and enter into solemn "gentlemen's agreements" to stop it. The agreements were hardly made before they were broken. In consequence, laws prohibiting rebating were passed, and the rate making power was taken from railway officers. Likewise, for years the Master Car Builders' Association, an organization maintained by the railways, adopted standard safety appliances for freight cars. Many railways would not observe its recommendation. In consequence, in 1910, Congress passed a law giving the Interstate Commerce Commission authority over safety appliances and the administration of that law has cost the roads many millions of dollars.

There have been few things more ridiculous and scandalous in the history of our railroads than the way in which they have made, revised, reformed and violated their car service rules. If rules regarding the handling of cars are good enough to be made by the railways they are good enough to be observed, and whether the recent order of the Interstate Commerce Commission stands or not, it is evident that if the roads do not voluntarily obey the car service rules they will be forced to do so.

THE INCREASE IN FREIGHT CAR EFFICIENCY

THE commerce and industry of the United States recently have suffered from the most severe shortage of freight cars and congestion of traffic in 10 years. As usual when railway service is not adequate and satisfactory, it has been charged frequently that the condition has been due to the inefficiency with which the managements of the railways conduct their business. Reference repeatedly has been made to the alleged unreasonably slow movement of cars, and this has been attributed to slow movement of trains caused by the efforts of the managements to economize by handling the maximum practicable tonnage per train.

The answer to these criticisms is afforded by an article on freight car efficiency which is published elsewhere in this issue. The Interstate Commerce Commission some weeks ago ordered the railways to furnish it statistics showing their situation with respect to car shortage or car surplus in the fiscal years from 1913 to 1916, inclusive, and in the months of September and October of each of these years, and also showing the average number of miles made per day by each freight car on their lines in the years and in the months mentioned. Forty-six important systems operating 65 per cent. of the total mileage of the country, and serving all sections, have, at the request of the *Railway Age Gazette*, furnished to this paper a large part of the same information which they have furnished to the Commission. The statistics of these lines make clear that the car efficiency of the railways of the country during the fiscal year ended on June 30, 1916, was greater than in any previous year, and that the car efficiency attained in the months of September and October surpassed that attained in any previous months in their entire history.

The best previous record made in any year was that in the year ended on June 30, 1913. In that year the average mileage made per car per day on the 46 lines which furnished their figures to the *Railway Age Gazette* was 26.69 miles. In the fiscal year 1916 the average for these roads was 29.03 miles, an increase of 8 per cent. The average daily mileage per car for these same railways in September, 1913, was 26.91 miles. In September, 1916, it was 31.54 miles, an increase of 17 per cent. Only 35 railways were able to give their average car mileages per day for October, 1916. Their average in that month was 32.17 miles.

It is reasonable to assume that if statistics were available for the railways having the remaining one-third of the mileage of the country they would show a proportionate increase in the rapidity of car circulation. On this assumption the mileage made per car per day on all the railways of the United States in the fiscal year 1916 was at least 27 miles, as compared with 24½ miles in 1913. It should be noted that the average capacity and the average load per freight car was also greater than ever before. The average capacity per freight car increased from 38 tons in 1913 to 40 tons in 1915, and probably was 41 tons in 1916; and there doubtless was a material increase in the average load per car between 1913 and 1916.

That increases in the average tons carried per train do not have a tendency to reduce the average miles made per car per day is indicated by the fact that between 1913 and 1915 the average load per train on all the railways of the United States increased from 445.4 tons to 474.5 tons, and that the average load per train on 27 of the 46 roads which made reports to the *Railway Age Gazette* increased from 516 tons in 1915 to 567 tons in 1916. In other words, the increase in car efficiency has been accompanied, and, in fact, undoubtedly promoted by increases in the average train load.

The statement that there was an increase of 8 per cent in car efficiency in the fiscal year 1916 over the year 1913, and an increase of 17 per cent in car efficiency in September, 1916, over September, 1913, may not mean much to persons unfamiliar with railway affairs. When, however, it is stated that there are now 2,400,000 freight cars on the railways of the United States, and that therefore an increase of 8 per cent in their average efficiency is equivalent to an increase of 192,000 in the number of cars, and that an increase of 17 per cent in efficiency is equivalent to an increase of 384,000 in the number of cars, the true significance of the increase in efficiency becomes apparent.

Persons unfamiliar with the details of railway operation are likely to draw the conclusion that an average movement of 25 to 30 miles per car per day is extremely small. It should be borne in mind, however, that this figure does not indicate the average speed of cars when they are made up in trains. It is arrived at by the simple method of dividing the total mileage made by all cars in a given period by the total number of cars in service. The result is that, to state the case in a paradoxical way, this figure reflects the speed which cars make when they are standing still as well as when they are moving. In other words, it is based on the time when, at the point of origin, cars are standing still in yards, when they are being switched to industries, when they are being loaded, when they are being switched back to the yards, when they are being made up in trains, and also on the time when at the point of destination they are being switched out of trains, switched to industries, being unloaded and switched back to the yards, as well as on the time they are in motion in trains. Therefore, to say that the movement of cars is slow because they move only an average of 27 miles per day is like saying that a man who walks 27 miles in the first 5 hours of the day and spends the remaining 19 hours in sitting still, is a slow walker because he walks only 27 miles per day. The present mileage per car per day is too small and ought to be increased, but persons who criticize the figures regarding it should at least make sure first that they know what the figures mean.

Letters to the Editor

COAL PRICES AND CAR SHORTAGE

NEW YORK.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I have read with interest various articles concerning problems of the coal trade in connection with car shortage, etc. To me, it is always a source of regret to note in some of the coal papers, a spirit of antagonism towards the railroads.

If any two trades are interdependent, surely coal mining and transportation are very closely interwoven (or allied) and, in addition, the railroads, I believe, consume for their fuel supply approximately 25 per cent of all the bituminous coal mined. No doubt neither side fully appreciates the problems of the other.

Railroad officials have been kept so busy of late attending on commissions and labor delegates, that they have had but little time for constructive work in other directions. The coal operator, who has had labor troubles of his own, ought to realize this, and show some sympathetic co-operation. For many years it has seemed to me that the bituminous trade of this country has been conducted in some respects in a rather bungling way. The anthracite people showed an excellent example, when, after the strike of 1902, they fixed prices for their product on a sliding scale, in order to induce the consumer to buy coal early.

Let us consider briefly the difficulties of both parties.

During the winter months, coal consumption runs probably from 10 to 15 per cent above that of the summer months. The cost to the railroad for train service, owing to cold waves, snow blockades, less free-steaming of engines, is fully 5 per cent above that of the summer months. Then there is the car shortage, due to crop moving, heavy coal movement and freer movement of merchandise during the winter months.

The coal producer's operating costs during the cold weather are largely run up by the car shortage, which means a much reduced production, with its attendant higher cost per ton produced.

Why not try to solve this problem by applying the modern efficiency idea of getting your customer somewhat interested in your problems and give him the benefit of your low cost of production, with the understanding that he is to pay proportionately more money in time of high cost of production. If, during the summer months, coal can be produced and transported more cheaply, it should, under average conditions, be sold more cheaply, and conversely, it should bring a relatively higher price in the winter. Why can't the price of coal at the mine, as well as transportation cost, be adjusted on a sliding scale? If the railroad rate is, say, $1.00 per ton from mines to market, it should be $1.10 to $1.15 during the four winter months from November 1 to February 28, and should be correspondingly lower for the four summer months from May 1 to August 30 and there might be an intermediate rate for the in-between seasons, that is, for March and April and September and October. By buying more coal in the summer and somewhat less in the winter, the consumer would be the gainer. Such an arrangement, therefore, would be to the advantage of all parties to the transaction, the producer, transportation companies and the consumer. Contracts for a year's consumption could be adjusted accordingly and if the trade once becomes used to the sliding scale people will be quite willing to adjust their contracts for the year on such a basis.

The best coal advertisement I ever saw was that of an anthracite dealer, which read as follows:

"We want to hire storage space in your own cellar for your own coal and will pay you 25 cents per ton for it."

This exactly covers the point. An inducement should be offered to the coal consumer so he will acquire storage capacity near his plant and all parties in interest would benefit by this.

The next question that arises is, how is that to be brought about? The railroad companies have too many problems on their hands now and would not want to propose a new rate structure, because this would mean they would have to apply to the interstate and various state commissions and would probably fear if they made the suggestion the railroads would be suspected of somehow trying to gain undue advantages. The public has acquired the habit of suspecting any move which the railroads may make on the theory of avoiding "Greeks bearing gifts." The coal trade has, in my opinion, much to gain by putting into operation the above arrangement and I would, therefore, suggest that the coal producers should take this up promptly.

F. J. LISMAN.

THE MENACE OF LABOR UNIONISM

CHICAGO.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Five railroads are ready and anxious to spend over $50,000,000 in relieving congested freight and passenger terminals at Chicago, but a few arbitrary union labor leaders have tied up all improvement work for more than six months for no other reason than the fact that they are making a mighty effort to bind the railroads for all time to come to use union labor only on all work.

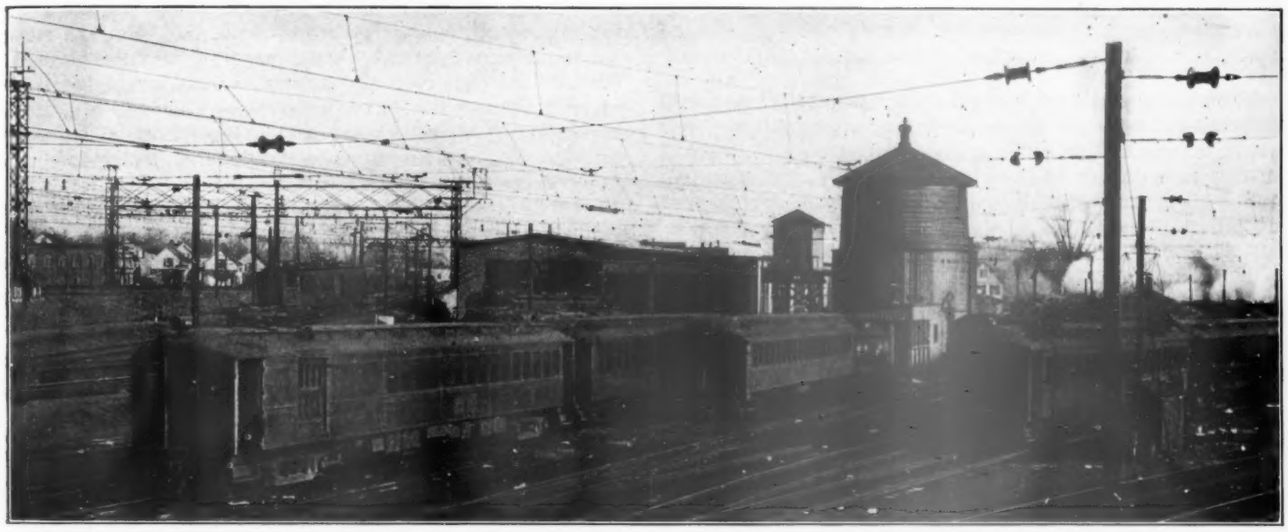
One railroad desiring to increase its terminal facilities has been able to build the concrete foundations for a new engine house only after heart-breaking and discouraging efforts. Forms were unaccountably loosened, mixes were too dry or too wet, reinforcement was left out where it should have been put in—everything possible went wrong, and finally the men were called out.

Another railroad is erecting freight houses. The posts, beams, etc., have been in place for months, yet union labor will not proceed with this work which in turn is delaying everything else in the entire scheme of improvements. Still another railroad contracted to erect a coaling station. This work started favorably but obstructions constantly appeared until finally all work stopped with the calling out of all union workers. Now all this work is at a standstill while the railroads are experiencing the worst terminal congestion in their history. What is the reason for all this? Are the railroads unfair and trying to make all their improvements with non-union labor? Not at all; this work has all been done by local contractors using only union labor. Are wages low or conditions bad? They are not. The reason is simply this—organized labor in Chicago assumes that by holding up a job of this magnitude, an improvement so earnestly desired by railroads and the public in general, it can force an agreement with the roads concerned that will provide for all work of whatsoever character done now or at any time in the future in Cook county to be performed by union labor. The railroads naturally refuse to yield under this pressure to such an unfair proposal.

It is to the everlasting shame of Chicago and Illinois that such a condition is allowed to exist. Why the federal government, always so eager to investigate conspiracies in restraint of trade, allows any organization so to interrupt commerce and disrupt trade, in absolute defiance of the constitutional rights of men and corporations, is something to wonder at. How long will the liberty loving citizens of these United States of America stand for this union labor menace?

WILBUR GORDON.

COKE PRODUCTION IN 1916.—The total coke production in 1916 was 54,300,000 tons, an increase over 1915 of 12,700,000 tons, or 30 per cent, and over 1913 of 8,000,000 tons.



Inspection Shed and Yards at Stamford.

The Maintenance of Electric Locomotives

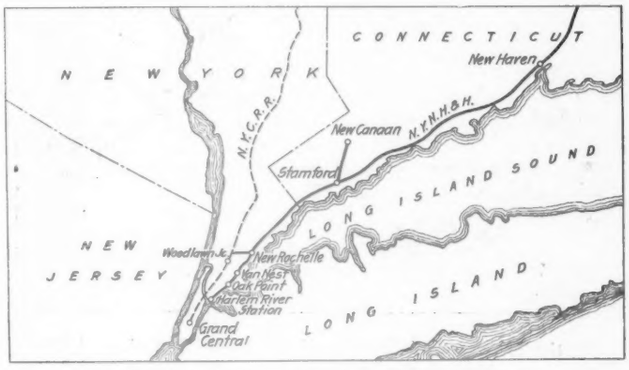
Methods Which Are Used on the New Haven to Secure Maximum Service from Its Electrical Equipment

ALTHOUGH progress in steam railroad electrification has been marked by radical departures from early methods and great increases in mileage during the past few years, it should be remembered that one of the pioneer projects of this nature—the New York, New Haven & Hartford—remains today the greatest in magnitude, in diversity and density of traffic handled, and is a conspicuous and successful example of an electrification system adaptable to all conditions of railroading. It has been operating under serious handicaps from the beginning, but has for several years maintained excellent records for reliability and economy. Probably the greatest responsibility for the attainment of such results lies in the maintenance of locomotive and motor car equipment, and it is the object of this article to outline the system of inspection and maintenance and to describe some of the features peculiar to electrical maintenance on the New Haven.

The general features of the New Haven electrification have been so well covered in the technical press that only a brief review will be attempted here. The electric zone includes the four-track line from Woodlawn Junction, New York City, to New Haven, Conn., 73 miles; the Harlem River branch from New Rochelle (on the main line) to Harlem River station, 12 miles, part of which is six-track and the remainder four-track; a single track branch from Stamford to New Canaan, Conn., eight miles, and practically all yards and sidings within the zone, the principal yards being those at Harlem River, Oak Point, Westchester, Stamford, Bridgeport and New Haven. The total includes nearly 600 miles of single track. Overhead catenary construction is used throughout, and the contact system is single phase, 11,000 volts, 25-cycles. Nearly all passenger trains run into the Grand Central terminal, using the 650 volt d.c. third rail of the New York Central from Woodlawn Junction into the station, therefore all equipment for such service must operate on both a.c. and d.c.; the freight and switching locomotives, however, operate on an a.c. only, and are free from the complication of the dual system. All motors are of the series type, identical in principle with the ordinary d.c. railway motor, but having laminated fields and special windings to adapt them to the inductive action of alternating current. The total equipment comprises 100 locomotives and 27 motor cars. Disregarding several experimental equipments, the locomotives may be divided into three types as follows:

(a) Passenger locomotives with axle mounted motors, armature being mounted on a hollow shaft or quill surrounding the driving axle, torque being transmitted from the quill to springs imbedded in the driving wheels. For a.c.-d.c. service between New Haven or Stamford and Grand Central terminal.

(b) Freight locomotive with geared motors, two motors per



Map of New Haven Electrified Lines

axle each engaging the same gear, which is mounted on a quill connected to the drivers through springs in a similar manner to that on the passenger locomotives. For straight a.c. operation on the line between Harlem River and New Haven.

(c) Switching locomotives with geared motors, one motor per axle, pinions on each end engaging gears rigidly mounted on driving axle. For straight a.c. operation.

Each motor car has a four motor equipment, and is suitable for hauling two heavy steel trailers. Twenty-one of the 27 motor cars have a.c.-d.c. control for operating into the Grand Central terminal.

There are in service now 47 a.c.-d.c. locomotives for passen-

ger traffic; 37 freight and 16 switching locomotives, the latter two classes operating on a.c. only.

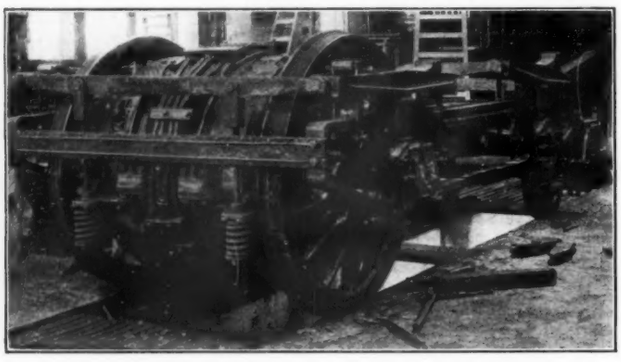
Service and Operating Conditions

Electrical operation covers all classes of service, and with sufficient rolling stock to handle the traffic, auxiliary power would be required only for a line repair train and a small amount of switching. The range of service includes suburban traffic, all classes of local and express passenger trains, time freight and drag freight, and switching in all yards throughout the zone. An important part of the switching service is the spotting of cars on barges for transfer by water. There is also one electric locomotive regularly assigned to a work train.

The amount of electrical equipment now owned by the New Haven is insufficient to handle all the traffic in the electric zone; there is also a shortage of steam motive power on the system. The result of this condition is that all electrical apparatus is kept in service every hour possible, increasing the difficulty of proper inspection and maintenance and subjecting the equipment to frequent overloads. Freight locomotives, intended only for road service, are used for doing a large amount of switching; and passenger locomotives have made as much as 500 miles in a day. In view of these conditions it is very much to the credit of the maintenance department that costs are kept down to a reasonable value.

System of Inspection and Maintenance

An electric locomotive crew is expected to be reasonably observant of the condition of the apparatus, mechanical and electrical. A work book, similar to that used in steam locomotive practice, is provided at each point where a run terminates, and the engineman enters in this book any defects observed at the end of his run, also checking off each item in the book on which he has no report to make. The locomotive is then turned over to the inspectors, and the crew, if not relieved, is available for any other engine or trains. The inspectors (or repair men) attend to items noted in the work book, make a hasty inspection, fill sand boxes, water and fuel oil tanks for train heaters, clean up where necessary,

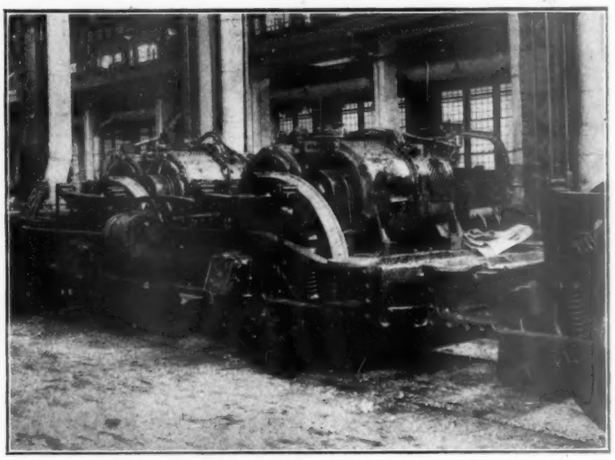


Partly Dismantled Locomotive Truck Showing Axle Mounted Motor

record repairs made on the page of the work book opposite the engineman's report, and the locomotive is ready for the road again, usually within a few minutes of its arrival. The principal points at which running inspection is made are Grand Central terminal, Harlem River, Oak Point, New Rochelle, Portchester, Stamford and New Haven.

General inspection for all locomotives and motor cars is made after a minimum mileage of 2,500. Records for this inspection are kept at Stamford. Actual mileage totaled from runs is used for road engines, but an estimate is made for switching locomotives based on an average speed of six miles per hour while in service. All passenger locomotives, motor cars, and two switchers are cared for at Stamford; all freight and the remaining switching locomotives are inspected at Oak Point yard, on the Harlem division, this being the most convenient point for reaching equipment of the latter class

Before the Van Nest shops were built, some of the passenger equipment ran above 300,000 miles without a general overhauling. All equipment now receives a periodic overhauling based on a mileage of about 150,000, which for passenger locomotives represents a year and a half to two years time between shoppings. Besides the usual mechanical repairs similar to those on steam locomotives, the electrical equipment



Freight Locomotive Truck, Showing Twin Motors Geared to Driving Axles

is completely dismantled, commutators turned, and fields and armatures impregnated with insulating compound.

General Inspection at Oak Point

The freight or switching locomotive which has completed 2,500 miles is sent to Oak Point. As soon as the locomotive is placed on the inspection track, an oiler cleans out and repacks pony truck bearings and driver boxes requiring attention and fills up motor bearing wells. An air equipment inspector runs the compressor for testing, and inspects air lines, valves and brakes. The electrical repair men first clean out all apparatus, then inspect motors, replace brushes, inspect and repair switch group contactors, filing or replacing burned tips, and examine in general all apparatus in the cab. Pantagraphs are inspected and tested, and worn out shoes and horns replaced. Complete inspection and necessary repairs are made to the frame, driving gear and other mechanical parts.

While freight locomotives receive road inspection at the end of each run, switching locomotives are in service practically 24 hours a day; the yard crews work in three 8-hour shifts, the same locomotive continuing in service with a change of crew and no attempt is made at daily inspection. If some defect interfering with operation is observed by the engineman, he takes the engine over to the inspection track for repairs, otherwise the switching locomotives receive no attention between regular mileage inspections which are based on 2,500 miles, the same as the freight locomotives.

A day force only, working nine hours, is employed for locomotive inspection at Oak Point. The work is usually done at the rate of two locomotives per day. One man is kept there all night for emergencies. Altogether, 23 men are employed here to care for 50 locomotives.

A concrete building adjacent to the inspection tracks serves as headquarters for locomotive inspection and also for a large repair yard nearby; it contains a storeroom, blacksmith shop, air compressor room, locker room for the repair force and the office. Practically all the machinery in the place is

contained in the air compressor room and the blacksmith shop, which are used almost altogether by the car repair force. Stepdown transformers in a separate building supply three phase low tension power to the air compressors and single phase power for lighting and small motors.

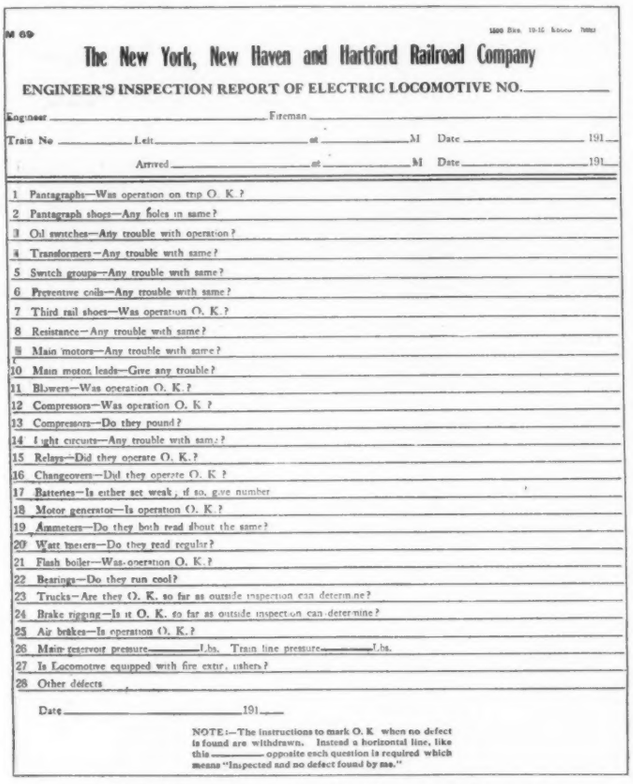
The storeroom handles all such parts as may be replaced without heavy repairs; among the principal items may be mentioned motor brushes, pantagraph shoes and horns, repair parts for switch groups and oil switches, and all parts necessary for light mechanical repairs. The storeroom is handled in a similar manner to others on the system.

The shop or test room originally contained no power equipment, but a portable pneumatic drill has been set up to serve as a drill press. The principal facilities in the room are those used for testing. A novel and efficient apparatus has been developed for testing the control cable jumpers used in multiple unit operation. Another time-saving device is that used for testing fuses; it consists of two brass strips mounted on a board to form a "V," but not making contact at the bottom. A fuse of any size may be used to close the circuit between the strips, and a lamp in the same circuit indicates whether the fuse is good or bad. Control batteries are cleaned and repaired in this room, and a motor-generator taken from a locomotive equipment is used to charge the batteries.

Aluminum pantagraph horns furnish one of the most annoying items of maintenance, especially on switching locomotives. It is found that with frequent passage over deflectors, horns will sometimes last only a few hundred miles. Some improvements are being made in the overhead construction to remedy this condition. A sheet iron pantagraph shoe is good for approximately 1,600 miles. It is customary to fill the groove in the shoe with graphite lubricant, but the value of this is somewhat questionable.

The frequent starting and stopping of switching locomotives result in considerable wear and burning of switch group contacts, and this feature receives particular attention at inspection. Some trouble was originally experienced with control batteries and motor-generators, due to lack of regularity in charging the batteries. This has been remedied by designating certain hours for battery charging, each crew operating the motor-generator for the first two hours of its shift, the crews changing at 7 a. m., 3 p. m., and 11 p. m.

Oil switches are regularly overhauled once in three months, and are also inspected for damage following short circuits or opening under severe overload.



M 69

The New York, New Haven and Hartford Railroad Company

ENGINEER'S INSPECTION REPORT OF ELECTRIC LOCOMOTIVE NO._____

Engineer _____ Fireman _____

Train No _____ Left _____ at _____ M Date _____ 191__

Arrived _____ at _____ M Date _____ 191__

1 Pantagraphs—Was operation on trip O. K.?
2 Pantagraph shoes—Any holes in same?
3 Oil switches—Any trouble with operation?
4 Transformers—Any trouble with same?
5 Switch groups—Any trouble with same?
6 Preventive coils—Any trouble with same?
7 Third rail shoes—Was operation O. K.?
8 Resistance—Any trouble with same?
9 Main motors—Any trouble with same?
10 Main motor leads—Give any trouble?
11 Blowers—Was operation O. K.?
12 Compressors—Was operation O. K.?
13 Compressors—Do they pound?
14 Light circuits—Any trouble with same?
15 Relays—Did they operate O. K.?
16 Changeovers—Did they operate O. K.?
17 Batteries—Is either set weak; if so, give number
18 Motor generator—Is operation O. K.?
19 Ammeters—Do they both read about the same?
20 Watt meters—Do they read regular?
21 Flash boiler—Was operation O. K.?
22 Bearings—Do they run cool?
23 Trucks—Are they O. K. so far as outside inspection can determine?
24 Brake rigging—Is it O. K. so far as outside inspection can determine?
25 Air brakes—Is operation O. K.?
26 Main reservoir pressure_____ lbs. Train line pressure_____ lbs.
27 Is Locomotive equipped with fire extinguishers?
28 Other defects

Date _____ 191__

NOTE:—The instructions to mark O. K. when no defect is found are withdrawn. Instead a horizontal line, like this _____ opposite each question is required which means "Inspected and no defect found by me."

Work Book Page for Engineman's Report

The reverse side of this form is ruled so as to give a space in which to show who made the repairs and the date; there is also space for remarks.

Safety Features

Inspection is performed over outdoor pits under contact wires energized independently from the remainder of the yard by a double throw line and ground switch. Experience has shown that ordinary reasonable precautions are not sufficient for men working on high tension apparatus; every possible precaution must be taken to prevent accidents. A man wishing to work on the roof of a locomotive must secure permission from the foreman, then report to a specially designated employee who opens the double-throw yard switch, throwing it from the 11,000 volt line to the ground, and puts a flag out at the switch point. Each man has his own flag; the one who is working places his flag on an elevated platform facing the inspection track and opposite the track on which he is working; he also reverses a sign with "Live Wire" on one side and "Dead Wire" on the other, which is suspended across the stairway leading to this platform.

M2 INSPECTION CARD

ENGINE NO. _____ DATE IN _____

APPARATUS	INSPECTED BY
Sw. Groups	
Oil Switch	
Resistance	
Main Wiring	
Inst. & Relays	
Batteries	
Blowers	
Compressors	
Boilers	
Air Equipment	
Pantagraphs	
3rd Rail Shoes	
Bell	
Trucks	
Brakes	
Bearings	
Gears	
Wheels	
Quills	
Main Motors	
Air Gap No. 1	
No. 2	
No 3	
No. 4	
Side Rods	

REPORTED DEFECTS

DATE OUT _____ FOREMAN _____

Card Used for Regular Inspection

No move can be made to restore power to the line until this same man has taken down his flag, again reversed the sign and reported clear.

The track switch leading to the inspection yard is protected by a special lock, the key to which is kept in the foreman's office. A locomotive arriving at the switch and wishing to enter, signals by a push button at the switch, which rings a bell in the office; a man is then sent from the office with the key, first to see that all men working on the track are clear, then to the switch to let the locomotive in the yard. In addition to this precaution, car repair flags are used, mounted on special clamps fitting over the rail heads, which cannot be overturned by anything short of a car or locomotive.

The sectionalizing wood insulator in the overhead contact line, which separates the inspection track circuit from the rest of the yard, does not have the wings usually provided to make simultaneous contact on the pantagraph shoe on both sides of the insulator. This obviates the chance of energizing a grounded contact wire when a locomotive enters the yard,

which is a matter of occasional occurrence when a locomotive passes an insulator from a live to a dead section.

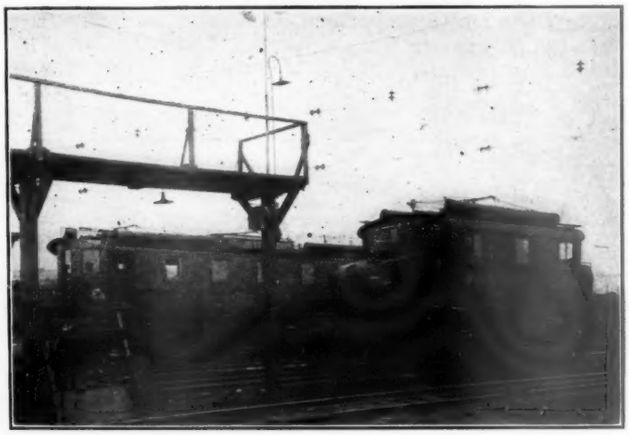
Inspection at Stamford

Stamford is an extremely busy terminal, for the maximum utilization of electrical equipment is principally dependent on the work done there. Steam and electric terminals are combined about a half-mile east of the passenger station, the electric inspection shed being adjacent to the steam locomotive roundhouse. Inspection pits are located inside the shed, and there is no trolley wire in the shed, consequently no chance of accident to repair men, as no work is permitted on the roof or on live parts out in the yard. The shed is divided into two parts, each containing three tracks about 85 feet in length.

The first part is the old shop, which was used for overhauling and heavy repairs during the first seven years of operation, until the large shops at Van Nest were built. The principal items of equipment are hydraulically operated drop pits at one end of the shop, and at the other a heavy jib crane of a hand operated type, but now equipped with a single phase motor. Machine tools, belt driven from a line shaft, include a 24-in. lathe, a 24-in. shaper, a 30-in. drill press and double emery wheels. Spare sets of drivers with axle-mounted motors are kept here, and in case of motor trouble on a locomotive, it is placed over the drop pit, the driving axle removed and the spare substituted, all in two hours' time. Drivers are also replaced for worn tires or other defects, and pony truck wheels, which are subject to rapid flange wear, are changed here very quickly. This shop is more of a convenience than a necessity since the Van Nest plant was completed, but a great deal of time is saved by its use. Motor driving axles are transported between Stamford and Van Nest on a specially constructed car.

The other part of the shed contains three pit-tracks for inspection of motor cars and locomotives. Overhead platforms run the length of the tracks at the height of a car roof, for inspection and work on pantagraphs and other outside equipment, and a man can walk from one car roof to another over these platforms. For testing air equipment, the compressor on a locomotive is operated on 600 volts d.c. from an overhead insulated line provided with contact points at frequent intervals to which a hook on the end of a pole is hung, connected to a lead which is run to the compressor. This lead is fused near the top of the pole for protection of the line and apparatus.

Passenger locomotive inspection is divided into two classes —light and heavy. Light inspection is similar to that described for Oak Point; apparatus is blown out, insulators cleaned, worn brushes renewed, switch group contact tips filed or replaced, master controller, reverser and interlock contacts cleaned, pantagraph shoes renewed, air equipment and brakes tested and adjusted, and all bearings attended to.



Inspection Pit Tracks at Oak Point

Reducing valves in air lines are changed at each inspection, and the valves cleaned and repaired in the shop. Motor bearing leaks are discovered by unusually low oil level in the well, as the quantity of oil normally used is well known.

Heavy inspection occurs at about each fourth mileage period. It involves principally extra work on motors. All brush holders are removed, the motors given an especially good cleaning and paint applied where needed. Magnet valves in the control system are also cleaned. It has been found that this system is effective in preventing flashovers and grounds due to an excessive amount of dirt in motors. Insulation tests are made on grid resistors, as neglect of this feature has been found to result in trouble from grounded resistance.

An itemized inspection card is issued for a locomotive when it is brought to the shed, on which each inspector or repair man, when his work is completed, signs his name opposite the item he has attended to. There are five or six

Oak Point Yard and Inspection Tracks Showing Pantagraph Inspection Platforms in Foreground

men working on a locomotive at one time, and the best efficiency is obtained by assigning certain items to one man, and having him attend to those same items for each locomotive he works on. Day and night shifts are worked at Stamford, the usual rate at which work is done is two light and one heavy locomotive inspection by the day force, and one light locomotive and two motor cars inspections at night. Ninety men are employed to take care of 49 locomotives, 27 motor cars and 50 trailers. In this connection it may be of interest to state that each trailer has electric heaters, storage battery for lighting and a motor generator to charge the batteries, operated by a power line from the motor car, also multiple unit control lines and master controllers, so that a train may be operated from a trailer as well as from a motor car.

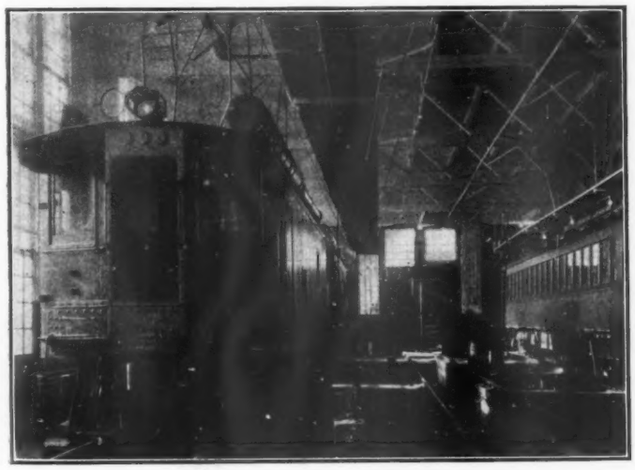
The capacity and efficiency of the steam locomotive roundhouse was increased considerably by the substitution of an electric locomotive compressor motor for a gasoline engine formerly used to drive the turntable. The motor operates on either single phase or 600 volts d.c., one being available in case of failure of the other. The installation is entirely the work of the local shop force.

Terminal Inspection at Grand Central

Considerable interest attaches to the work at the Grand Central terminal on account of the congestion at this point. Six men in the day and two at night attend to terminal inspection and emergency repair. The work must be done as quickly as possible, also with a great deal of care, as delays on the terminal division are disastrous; the slightest delay or loss of time, even though it does not involve stopping the train, is cause for a complaint and investigation. Light movements into or out of the terminal are kept down to a minimum; it is only when the prevailing direction of traffic demands locomotives at another point, that they are moved from the terminal without trains.

Special Features of Electric Locomotives

There are numerous equipment details of special interest as showing the part taken by the maintenance department



Inspection Shed at Stamford

in overcoming difficulties and influencing the design of new apparatus. The step-down transformer (11,000 to 350 volts) is a good illustration. On the first locomotives, auto transformers were used, but since the low tension winding was part of the high tension circuit between pantagraph and ground, the low tension was necessarily a grounded circuit; the result was a heavy short circuit and bad burn-out whenever a motor grounded. The newer locomotives all have two-winding transformers with ungrounded secondaries and ground detector lamps which enable insulation trouble to be located and cleared up before any damage is done. It is worthy of note here that transformer trouble is practically unknown, there being but one burn-out on record on more than fifty freight and switching locomotives.

Forced ventilation of air compressors is a novel scheme developed by the maintenance department; a pipe conducts the air from the blower to a jacket on the cylinder. The battery power for the control is protected by a reverse current relay between the motor-generator and the battery; this prevents a rapid discharge of the battery into the motor generator that would otherwise occur when power is cut off. Experience with wooden reverser drums has shown this ma-

Stamford Roundhouse and Turntable Adjacent to Electric Inspection Shed

terial to be unsuitable on account of insecurity of wooden screw fastenings and liability of the wood to char when the metal is heated by poor contact. Micarta has been found much more satisfactory, but the metal spider construction similar to a street car controller is the best. Motor brushes were originally supplied with flexible copper shunts, but owing to trouble with loose and broken connections, the shunts are now omitted and dependence placed on the brush holder contact as in d.c. railway motor practice.

Single phase locomotives, when built for high speed service, carry somewhat more weight than is necessary for traction. This statement is true of the New Haven freight locomotives, which are built for a speed of 45 miles an hour and which under ordinary conditions cannot slip their drivers. The nominal rating for trailing load is 1,500 tons, but as the speed is somewhat high for freight service, a considerable advantage was gained in two of the locomotives by changing the gear ratio for a slightly lower speed and greater drawbar pull, giving a rating of 1,900 tons trailing load, and establishing a very fair ratio between locomotive weight and tractive effort. The switching locomotives, which are designed for low speed and have all their weight on drivers, are worked right up to the limit of adhesion. The overload tractive effort possible with the freight locomotives makes necessary some precautions to prevent overloading of motors. There is a temperature indicator in the cab, operated by a push button connected in circuit with the control battery and a resistance wire imbedded in a motor field; this is of some value, but is not depended on for short heavy overloads; the ammeter in the cab is watched more closely and 1,800 amperes for seven minutes is given as the permissible limit for short time overload in starting a train.

Excessive speed on a geared locomotive may result in bursted armature bands and damaged windings. These locomotives are therefore equipped with speed limit relays having potential and current windings connected in motor circuits and operate at a certain definite relation between motor voltage and current, that relation depending only on the speed of the motor. The freight locomotive limit is 45 miles per

hour, while the same type of machine in passenger service has a limit of 56 miles per hour.

The original New Haven passenger locomotives have no speed limit devices, as they are probably the best adapted to high speed of any locomotive ever built, considered as to the effects on either track or equipment. The drawback to this design is the limited amount of motor capacity that can be applied to one axle within clearance limits.

All locomotive motors now in service have resistance leads between armature winding and commutator, to limit the local current induced when a coil is short circuited by the brushes. This type of motor is quite dependable, as shown by the fact that many of the original armature windings, in service for ten years, have received no repairs, and motor burnouts can always be traced to abuse of equipment. The latest motor cars have a type of motor without resistance leads, but with a more complicated field winding, known as a doubly-fed single-phase motor. It has somewhat better weight efficiency than the older type and promises to give even better maintenance results.

LOUISVILLE & NASHVILLE EXTENDS ABSOLUTE-PERMISSIVE SIGNALING

The Louisville & Nashville has recently put in service 113 miles of single-track automatic block signals on its Knoxville division, making a continuous installation from Cincinnati, Ohio, to Etowah, Tenn., 351 miles; and has completed an installation of 63 miles between Calera, Ala., and Montgomery. These sections are single-track and the "absolute-permissive" scheme of control, which has been used in all single-track automatic signaling installed on this road since 1913, was adopted. This arrangement has been such a decided success on the L. & N. and is liked so well by division officers that it is contemplated changing the method of control of the signals between Lafollette and Corbin from the old style circuits for single-track automatic work to the absolute-permissive scheme.

The signal mechanisms used in these installations are the model 2A, base-of-mast type made by the General Railway Signal Company, giving indications in the upper quadrant. All relays, switch boxes, and switch indicators were supplied by the same manufacturer. Steel enameled semaphore blades were used on all signals. The lighting is by oil lamps with long-time burners. The marker lights have lunar white roundels.

One special feature of construction is the use of concrete boxes, instead of chutes, to house track batteries, and larger concrete boxes, in place of battery vaults, for signal batteries. The smaller size has a capacity of six cells of BSCO battery, and the larger size 20 cells. At locations where betweeen 20 and 40 cells are used a Massey, style K, battery well is provided, and where over 40 cells are required they are housed in a Massey, style C, well.

Cypress trunking with 1½-in. groove conforming to R. S. A. specifications is used throughout. All trunking except that crossing under tracks is installed above ground and is not painted. In all cases where trunking passes under tracks, the groove is filled with pitch after the wires are in place.

A new pole line was built to carry the line circuits, it being the policy of this company to carry its signal wires on its own poles. The railroad company's despatching and message circuits have been transferred to this line so that all of the L. & N. line circuits are now on the company's pole line. The poles are spaced 150 ft. apart and are chestnut, Western Union Standard, class B. All cross-arms are 10-ft., 10-in. long, of Washington fir. No. 12 copper-clad wire is used for all signal control and indicator circuits, and No. 10 copper-clad is used for the common wire.

Track circuit conditions on this line are ideal, rock ballast being used throughout. The longest track section is 4,500 ft. The rail joints are each bonded with two No. 8 B. W. G. galvanized iron bond wires except through tunnels and road crossings where two No. 6 B. & S. copper-clad wires are used. Bond wire protectors are provided throughout. The track battery is Edison primary caustic soda battery, 500 a. h. capacity, the usual arrangement being three cells in multiple. Track relays of 1.9-ohms are being used in these installations instead of the 4-ohm. Derails, pipe-connected to the switch stand, have been installed on all main line switches except cross-overs.

In the use of switch indicators, the general practice was followed, i. e., placing them at switches that are not in close proximity to a signal location, and at long industry switches where the complete train can enter and not occupy the main track while switching. At cross-overs there is a switch box at each end. Signal control circuits are broken through the box on the main track end of the cross-over, the box on the siding end merely shunting the main track when the switch is open.

Typical Double Locations at Ends of Sidings

These installations were made by the signal construction forces of the L. & N., under the direction of the general signal foreman and his assistant. We are indebted for the foregoing details to F. H. Bagley, assistant signal engineer.

COAL SHORTAGE IN SWITZERLAND.—The Swiss State Railways, owing to the insufficiency of coal, which previously has been imported from Germany, recently announced that they would be forced to reduce railroad traffic by one-third, beginning February 15.

I. C. C. Prescribes Partial Code of Car Service Rules

Report On Freight Congestion. Rules Prescribed for Coal, Refrigerator and Ventilated Cars. Dissenting Report.

THE Interstate Commerce Commission on Saturday, January 20, issued a report by Commissioner McChord on the car supply investigation. Without awaiting the result of its recommendation to Congress in its annual report of December 1 that the commission be given authority in law to prescribe rules and regulations governing the interchange and return of cars, although several bills have been introduced for that purpose, the commission found that the car service rules of the American Railway Association, in so far as they relate to open-top coal and coke cars and to railroad owned and controlled refrigerator, heater, ventilated and insulated cars, are unreasonable to the extent that they differ from car service rules prescribed in the report. Action with regard to car service rules for application to other classes of cars is deferred pending the appointment by the railway executives of a committee vested with plenary powers to co-operate with the Interstate Commerce Commission at Washington in securing a more equitable distribution of cars.

Commissioner Clark wrote a dissenting opinion in which Commissioners Clements and Hall concurred, saying he is unable to agree with the majority report either as to interpretation of the law and of the powers of the commission to issue such an order, or as to the conclusions reached as to the necessity for such an order or the propriety of the order issued. An abstract of Commissioner McChord's report is as follows:

Report of the Commission

The present conditions of car distribution throughout the United States have no parallel in our history. In some territories the railroads have furnished but a small part of the cars necessary for the transportation of staple articles of commerce, such as coal, grain, lumber, fruits and vegetables. In consequence mills have shut down, prices have advanced, perishable articles of great value have been destroyed, and hundreds of carloads of food products have been delayed in reaching their natural markets. In other territories there have been so many cars on the lines of the carriers and in their terminals that transportation service has been thrown into unprecedented confusion, long delays in transit have been the rule rather than the exception, and the operation of established industrial activities has been made uncertain and difficult. These conditions have made necessary a far-reaching investigation by the commission and now urgently demand prompt, decisive action.

In response to many complaints the commission, on November 4, 1916, entered upon a general investigation covering all sections of the United States. A hearing was held at Louisville, Ky., and witnesses representing substantially all of the principal carriers of the country were examined with reference to their supply and use of freight cars. Evidence on the part of shippers and consignees was also taken. For some time prior to the commission's investigation there had been a general misuse of freight cars by substantially all of the respondent carriers. The substance of these misuses was the failure to observe A. R. A. car service rules 1, 2, 3 and 4, which provide for the return of cars to the owning roads. The failure to observe these rules became a common practice as the volume of traffic increased during the past few months. Cars received for a line haul by foreign carriers were used for continuous local service on those lines and those received for switch movements received the same usage. These practices were frankly admitted by substantially all carriers, and while on behalf of some lines a desire to observe car service rules was expressed, it was stated that they could not do so unless other lines would also conform to those rules. The misuses of equipment resulted in depriving the owning lines of cars which they had provided, in diverting such cars from the normal channels to the transportation of other commodities in other territories, in reducing in large measure the ability of certain carriers to serve the shippers and consignees of freight located on their lines and the lines of their connections, and in denying to many shippers and consignees such transportation facilities as were necessary to them and such as they would have received if freight cars had been handled in accordance with car service rules. Embargoes were placed by some lines against the movement of their own coal cars beyond their rails, for which they gave the explanation that such measures were necessary in order to retain on their own lines sufficient coal cars to serve the communities dependent on them for fuel—a practice which had been held unlawful in *Missouri & Illinois Coal Co.* v. *I. C. R. R.*, 22 I. C. C. 39.

Following the disclosure of these and other facts of record, and on November 14, 1916, while the hearing was still in progress, the carriers were requested by the presiding commissioner to return foreign open-top cars and refrigerator cars to the owning lines, either loaded or empty, without delay To this request all of the carriers which were represented at the hearing gave their assent and filed severally their instructions for such return of these cars. At the hearing the carriers were requested to lift the embargoes which had been placed against the movement of their coal cars beyond their rails.

During the progress of the investigation it was suggested to the carriers that prompt action be taken by their executives to relieve the deplorable conditions. In response to this suggestion, at a meeting of the American Railway Association on November 15 a Conference Committee on Car Efficiency was created "to sit constantly in Washington, to deal with the car situation." That committee and the Car Service Commission of the American Railway Association, the latter being hereinafter referred to as the car service committee, went to Louisville and held an informal conference with the presiding commissioner. At this conference, with reference to the creation of the car efficiency committee, Mr. C. H. Markham, president of the Illinois Central, read a statement in which, among other things, it was said:

> The American Railway Association has delegated full authority to this committee to handle the car interchange question. We propose to increase the per diem charges on December 1, on which date we expect the proposed increase in demurrage charges will go into effect. We also propose to put into effect penalties for diversion of and delays to equipment on January 1, the earliest practicable date.

This committee took up its work in Washington and at once directed the return of open-top cars and fruit refrigerator and heater cars to the owning lines. On December 1 the car efficiency committee took action with reference to the relocation of box cars. In spite of the efforts which had been made to put a stop to the diversion and misuse of foreign refrigerator cars and coal cars the commission's inspectors day after day reported numerous instances of such diversion and misuse. Similar reports were made to the commission by a number of individual carriers. It appeared that the car efficiency committee was not securing obedience to its directions * * * (The report here quotes telegrams interchanged on December 4, 5 and 6 between Commissioner McChord and C. H. Markham, president of the Illinois Central, expressing the disappointment of the commission in the progress made by the committee on car efficiency and doubt about the committee's power, and stating that unless the conference committee

is given sufficient power and uses it, without hesitation in its co-operation with the Interstate Commerce Commission, and unless the individual carriers obey its orders, no good results can be obtained by such co-operation. Mr. Markham replied that his position as chairman of the committee which had conferred with Mr. McChord at Louisville, was but temporary and referred to a meeting of the executive committee of the American Railway Association in New York.)

A meeting of the executive committee of the American Railway Association was held in New York on December 5. On that date, in order that that committee might have a full understanding of the commission's position, a telegram was sent to George Hodges then at New York City, repeating the telegrams above referred to. At that meeting the work of the car efficiency committee was delegated to the car service committee, which, as reconstituted, consisted of Messrs. Park, Pearson, Sheaffer, Worthington and Fairfax Harrison, president of the Southern Railway, its chairman, by whom a statement was submitted to the commission defining the powers of the car service committee.

On December 15 the car service committee issued its circular No. 3, which amended and interpreted the circular of December 1.

The record before us, as well as the numerous complaints received by the commission daily from certain sections of the country, shows that the present car shortage conditions are serious and require immediate relief. The supply of coal in many communities is inadequate, and the prices demanded are very high. Public service companies, which furnish light, heat and power to cities and towns, face a possible interruption of this indispensable service through lack of fuel. At the time of the hearing some of the carriers themselves had but two or three days' supply of coal, others had entirely exhausted their stored supply and were dependent upon the daily movement of loaded coal cars for their motive power. Commercial coal was being confiscated for this purpose, with its resultant loss of immediate supply to the intended consignees. In the event of severely cold weather which every winter brings, a continuation of present conditions will inevitably cause hardship and suffering.

The need of restoring to their proper uses railroad owned or controlled refrigerator cars and heater, ventilated, and insulated cars is not less urgent. Lack of timely and adequate supply of cars suitable for such service has already caused severe losses. A large proportion of those classes of cars have left the rails of certain originating carriers and although some are being returned, their home movement is slow, while others are used for the local movement of dead freight on foreign lines. The misuse of foreign refrigerator cars has continued notwithstanding the directions for their return to the owning lines.

On many southern and western lines the available supply of box cars is but a fractional part of those which would be required to move the traffic offered. The flow of traffic northbound and eastbound has carried box cars from the originating lines into central freight association, trunk line, and New England territories. At many points in these territories there are large accumulations of cars due to many causes, such as the unprecedented traffic, lack of adequate yard, trackage, warehouse and elevator facilities, insufficient motive power, inefficient operation, lack of ocean-carrying space, the holding of cars by shippers and consignees for speculative purposes, and the failure of consignees to unload promptly. The result is slow movement and disorganized service, conditions to which a reduction in the number of cars on line would give relief.

Abuses Continue

Urgent as is the need of relief for these conditions the respondents, with but few exceptions, have failed to afford such relief. They have assured the commission that they would put a stop to the diversion and misuse of foreign open-top cars and refrigerator cars, and would return those cars to their owners without delay, but since that assurance was given hundreds of instances of diversion and misuse have been called to our attention by owning lines and by our inspectors. While there has been some response on the part of some carriers to the commission's efforts to restore cars suitable for the transportation of coal and perishable products to their proper channels, it is apparent that there is still a general misuse of such equipment. We have received many appeals not only from shippers but from carriers for the entry of a formal order to remedy the situation. For the purpose of affording the carriers an opportunity to be heard upon the question, the respondents were ordered to show cause on December 28, 1916—

> why an order should not be entered requiring respondents to return to their owners, without diversion or misuse, all foreign open-top cars and all railroad owned or controlled refrigerator, heater, ventilated, and insulated cars after being unloaded at destination, either loaded or empty (*a*) direct, if belonging to direct connections, (*b*) through the proper home route if belonging to other than direct connections; or in accordance with such other rules as may be found reasonable and be prescribed;
>
> And to return all other foreign freight cars to their owners in accordance with car service rules, 1, 2, 3, and 4 of the American Railway Association or to effect a relocation of such cars in accordance with such other rules as may be found reasonable and be prescribed.

At the hearing on this order further testimony was taken and there was some argumentative discussion of the issues before us. The car service committee asks that no car service rules be prescribed by order prior to March 1, 1917. When analyzed, the reasons stated for opposing the entry of an order at this time prescribing such rules are (1) that the code of car service rules now in effect is practically new, and, on experience, may require amendment; (2) that a prompter movement of cars in the future may be expected by reason of the per diem increase from 45 cents to 75 cents, the progressive demurrage charges recently made effective, and the application on January 1, 1917, of the diversion penalty to open-top cars and refrigerator cars, and on March 1, 1917, to all other cars; (3) that the code of car service rules can not be applied to box cars consistently with the directions which have been given by the car service committee for the distribution of box cars without regard to ownership; (4) that the code of car service rules is not sufficiently flexible to provide for peculiar and difficult situations which may arise; (5) that the penalty of $5,000 provided in section 16 of the act for a violation of an order of the commission made under section 15, is wholly disproportionate to the offense of diverting a single car. We find these reasons wholly unconvincing in so far as they refer to open-top coal cars and refrigerator cars. It is true that the present code of car service rules appears to require some amendment. But the entry of an order by the commission would not preclude the further modification or revision of those rules upon a proper showing of reasonable necessity therefor. Likewise the anticipated prompter movement of cars presents no sufficient reason for withholding an order, especially in view of the fact that on January 13, 1917, the diversion penalty was entirely removed.

The increased per diem and the progressive demurrage charges may to some extent facilitate the movement of equipment, but they are unlikely to prevent the diversion and misuse of cars at a time when the demands for transportation are so great. In any event they are factors consistent with an order for the observance of reasonable car service rules and which, to the extent that they are effective, would promote such observance. Should the request of the car service committee that no order be entered prior to March 1, 1917, be granted, the winter months will have passed without such relief as an order can afford.

The executive committee of the American Railway Association also appeared in opposition to the entry of an order at this time, but the testimony given in behalf of that committee added nothing material to the objection of the car service committee above referred to. Certain respondents, notably

the Louisville & Nashville, the Chicago, Burlington & Quincy, and the Northern Pacific, expressed the desire that an order be entered.

In opposing the entry of an order requiring the return of box cars to the owning roads, the car service committee points out that in its efforts to secure a relocation of such cars the ownership principle has been wholly disregarded. The requirement that box cars be delivered to southern and western connections in stated percentages in excess of receipts is admittedly an emergency measure and our findings herein will not be inconsistent therewith.

The substance of the position of the car service committee is that the relocation of cars may be properly left to its activities. The propriety of this course is made doubtful by the fact that the car service committee has not been adequately empowered to deal with the situation, and has not secured the effective co-operation of the carriers as a whole. Although we were assured that a committee would be constituted with full powers, this was not done. The powers of the car service committee to secure the relocation of cars by the respondents are recommendatory in character. That it has not been able to secure the co-operation of a substantial number of the respondents is conclusively shown by its circular No. 5, December 18. In this connection it is proper to state that the members of the car service committee, although acting with wholly insufficient power and without the support of some of the largest railroad systems, have made an earnest and intelligent effort to bring relief to existing car service conditions.

Immediately following the hearing on December 28 the president of the American Railway Association notified the commission through one of its members that the chairman of the car service committee had resigned, and that this committee would be transferred from Washington to the city of New York. Subsequently an illuminating statement of the situation, fully set out in the appendix, was transmitted to the commission.

The Commission's Authority

While the question of the commission's jurisdiction to enter an order requiring the carriers to observe reasonable rules for the exchange, interchange, and return of cars used in interstate transportation has not been questioned upon this record, we are not unmindful of the general discussion of that question and others relating to car shortage found in our last annual report. What was there discussed covered several phases of car supply and distribution. It was made the basis of recommendations that the commission be given a specific authority to prescribe regulations governing interchange of cars. * * * But for the purposes of the issue immediately before us we think the powers conferred by the act are sufficient to enable us to require the observance of rules for car service found on this record to be reasonable and which in large measure are the same as those adopted by the respondents themselves.

In *Missouri & Illinois Coal Co. v. I. C. R. R. Co., supra,* it appeared that the Illinois Central had established a rule prohibiting the sending of its coal cars loaded with coal to the lines of certain designated carriers in order to retain on its own line sufficient cars to serve the communities dependent on it for fuel. This rule was attacked as unlawful. It was held that the temporary confiscation by carriers of the cars of other railroads and the placing of embargoes against cars being sent off the lines of the owners are alike unlawful and that the railroads would be expected to make such rules for the return of cars as would terminate such abuses * * * with respect to the exchange, interchange, and return of cars used upon through routes and for the operation of such through routes, and that where they have failed in this respect the commission is empowered to determine the individual or joint regulation or practice that is just, fair, and reasonable. The power of the commission to require a carrier to permit its cars to move from its line to the rails of a foreign line was clearly defined, and it is a necessary corollary that the observance of a reasonable rule for the return of such cars to the owning line may also be required. Section 1 requires the carriers subject to the act— * * * to establish through routes, * * * to make reasonable rules and regulations with respect to the exchange, interchange, and *return* of cars used therein * * *. Section 13 gives the commission full authority at any time to institute an inquiry, on its own motion, in any case and to proceed with any inquiry instituted on its own motion as though it had been appealed to.

We have been asked by shipping interests to invoke the provisions of sections 12 and 20 of the act. It is asserted that in so far as the present car service rules of the carriers are reasonable, but are not observed, we are authorized to require their observance by writ of mandamus. It is also suggested that an order may be made by the commission under the provisions of section 13, and it is argued that if neither of these remedies were available the carriers might easily nullify the requirements of section 1 with respect to reasonable rules governing the exchange, interchange, and return of cars. The contention is that, although it has been held that if a car service regulation or practice of the carriers is found to be unreasonable and in violation of the act, we can require the carriers, in a proceeding under section 15, to cease and desist from the violation and to establish and enforce a reasonable practice and regulation; yet if, on the other hand, the regulation or practice were reasonable, but not observed, there would be no remedy under the act. In this connection it is pointed out that there is no substantial difference in effect between an unreasonable rule which is enforced and a reasonable rule which is not enforced.

We do not resort to the provisions of sections 12 and 20, however, because certain changes in the present car service rules appear to be necessary, and for the reason that we do not deem it necessary at this time to take recourse to such drastic procedure, in view of our conclusion that the act empowers us to make an order requiring the observance of car service rules which we may find to be reasonable. It is clear that the entry of a formal order is necessary to protect shippers, consignees, and the general public, but not less is it necessary to protect those carriers which have sent foreign cars home in obedience to the direction at the hearing but which have not received their own cars from other lines. It would indeed be an anomaly if certain carriers could with impunity violate section 1 by failure to observe reasonable rules for the "exchange, interchange, and return of cars," and by so doing prevent other carriers from furnishing the transportation upon reasonable request which is required by the same section. While all the members of the commission are not in accord with respect to the powers of the commission to make an order in this case, the wrongs are flagrant, and even if there were doubt as to the commission's power to give full relief by formal order we think that in the emergency that doubt should be resolved in favor not only of the carriers who are wrongfully deprived of the use of their cars, but in favor of shippers and of the general public, who would be without adequate remedy if, having the power, we fail to act.

For purposes of bringing immediate relief to existing conditions, the present code of car service rules, with certain modifications, will have our approval for application until May 1, 1917, in so far as they relate to open-top coal and coke cars, and to railroad owned or controlled refrigerator, heater, ventilated, and insulated cars. The modifications found necessary consist in the elimination of certain movements of foreign cars other than to the owning road, or in its direction, which the present code permits.

The Commission's Findings

Upon all the facts of record we find—

A. That the present car service rules of respondents are

unreasonable to the extent that they differ from the following, which we find to be reasonable car service rules.

1. All foreign open-top coal and coke cars and all foreign railroad owned or controlled refrigerator, heater, ventilated, and insulated cars received under load may be forwarded to destination; when original lading is removed, or when received empty, they must be returned to their owners, either loaded or empty—

(*a*) Direct, if belonging to direct connections;

(*b*) Through the proper home route if belonging to other than direct connections.

(NOTE.—The home road shall have the right to demand the return of its empty cars at the junction point where delivered loaded. This right does not apply to cars offered home for repairs under the provisions of M. C. B. Rule 2.)

2. The proper home route for cars belonging to other than direct connections includes the following deliveries only:

(*a*) Loaded, consigned (via any route) to a destination on the home road;

(*b*) Loaded, consigned (via any route) to a destination on a direct connection of the home road; or

(*c*) Loaded, consigned to a destination on the road from which originally received, if such movement is in the direction of home; or

(*d*) Empty, to the road and at the junction point from which originally received.

3. (*a*) Loaded cars may be delivered to switching roads to be unloaded within the switching district. Such deliveries shall be indicated on the junction report by the words "for unloading."

A car received loaded in switching service, when the original lading is removed, must be returned to the home road, loaded or empty, if a direct connection within that switching territory; otherwise, unless it home routes from the switching line to some other road, it must be returned to the delivering road loaded or empty, in accordance with rules 1 and 2.

(*b*) An empty foreign car may be delivered to a connecting road to be loaded within the designated switching limits and returned. Such deliveries shall be indicated on the junction report by the words "for loading."

The road delivering the car to the switching road must in all cases specify loading, route, and destination, which must be in accordance with rules 1 and 2.

The switching road must comply with the instructions of the delivering road.

4. These rules do not apply to cars reconsigned with original lading under duly filed and published tariffs until the original lading has been removed therefrom.

5. Any delivery of a foreign open-top coal or coke car or foreign railroad owned or controlled refrigerator, heater, ventilated, or insulated car, except as provided in these rules, is a diversion.

We further find:

B. That the practices of respondents in failing to observe the present car service rules, with regard to the return of foreign open-top coal and coke cars and foreign railroad owned or controlled refrigerator, heater, ventilated, and insulated cars, to the extent that those rules are not modified by the rules here found reasonable, are in violation of section 1 of the act.

It is our view that the application to the car service rules herein found reasonable of a diversion penalty similar to that provided for in rule No. 3 of the code of per diem rules would be proper.

An order will be entered accordingly requiring the establishment and observance of the car service rules herein found reasonable until May 1, 1917, and will take effect under the provisions of the act not less than 30 days from the date of the service thereof. This order will be subject to modification, and the effective date subject to extension during that period, upon showing of reasonable necessity therefor.

The commission is of the opinion that prompt relief for existing car supply conditions can be secured through executive action; that it is the duty of all the carriers at once to appoint a committee, as contemplated at the hearing, vested with plenary power to secure a relocation of cars, and to cooperate with this commission at Washington, in order that we may be fully advised as to the situation from day to day. If this is done and it is found that any modification of our order is necessary, before or after the effective date thereof, the facts thus brought to our attention will be considered with that end in view. Unless this is done within 10 days from the service of this order, the entry of an order prescribing car service rules for other classes of equipment will be considered.

DISSENTING OPINION

Commissioner Clark, in his dissenting opinion, said:

I am fully sensible of the gravity of the existing conditions of transportation by railroad, and I appreciate the importance of adopting all reasonable measures for relief from the serious difficulties. I am, however, unable to agree with the majority report, either as to interpretation of the law and of our powers, or as to the conclusions reached.

The interpretation placed by the majority upon the act and the powers which it confers upon us is at variance with all of the interpretations heretofore adopted by the commission and with the views which it has expressed on this subject.

In *Missouri & Illinois Coal Co.* v. *I. C. R. R. Co.*, cited in the majority report, we said:

No testimony has been taken in this case as to the rules that should be enforced and our power would not be exercised in any event without the fullest hearing as to the effect any order that the commission might make would have upon the practices of the railroads of the country.

In the instant case the testimony of record as to the rules which the majority find to be unreasonable is to the effect that they have been very recently adopted and that no one can tell what their effect will be.

In *In the Matter of Car Shortage and Other Insufficient Transportation Facilities*, 12 I. C. C., 561, decided in January, 1907, separate reports were presented by the two commissioners who heard all the testimony. In one of them it is said:

If the Interstate Commerce Commission is to be vested with power to make rules under which railroads shall be required upon penalty to furnish cars to shippers, this commission should also be empowered to make rules under which free interchange of cars shall be effected, or require railroads engaging in interstate commerce to make such rules for their own protection and provide for their enforcement.

In the other it is said:

Some railroad men of prominence appearing before us seemed to think that the more effective regulation of the interchange of cars by carriers would of itself go far toward remedying the present car shortage. There seem to be strong reasons for thinking that the proposed car pool or car clearing house would result in a more effective car service. If some such adjustment can not be reached by the companies themselves it may be that legislation will become desirable and necessary.

These reports were unanimously agreed to by the commission, and the significance of the expressions quoted, to the effect that the commission did not have power to prescribe general rules relative to interchange of cars, and the possibility or probability that such legislation might become necessary, can not escape notice.

In its annual report submitted to the Congress a few weeks since, the car shortage situation was discussed quite fully, and recommendation was made that the commission be given authority in law to prescribe rules and regulations governing the interchange and return of cars and the compensation which one carrier should pay to others for the use of cars.

I am not satisfied that this record discloses a proper basis for the finding that the existing car service rules are unreasonable, because, as noted, they have been in effect only since January 1, 1917, and the substance of the testimony relating to them was that no one could tell how satisfactory or efficacious they would be. I am not satisfied that the record contains a proper basis for the finding that the rules prescribed in the order herein are reasonable.

The underlying idea is that open-top coal and coke cars and railroad owned refrigerator, insulated, and ventilated cars shall be returned to their owners, while as to all other cars the American Railway Association rules are left to apply, and ownership is disregarded. Were it not for the long established custom, voluntarily agreed to among the railroads, under which all carriers members of the American Railway Association accepted the car service rules of that association and put their cars into service thereunder, there would be strength in the argument that the owner of the car is entitled to first claim on it. If as a matter of law carriers are required to promptly return to their owners coal and coke and refrigerator cars, I am unable to see why that same law would not extend to other kinds of cars.

The commission is essentially an administrative body, exercising powers specifically delegated to it by the Congress. It also exercises quasi judicial powers, likewise delegated. But if the law is to be interpreted differently from time to time to fit conditions that obtain on the railroads, and the commission exercises in a time of stress a power which it has not only never before felt that it had, but which it has several times said it did not have, it adds to its delegated administrative and quasi judicial powers legislative powers, for the exercise of which I can find no justification.

The times are abnormal, and they call for exercise of special effort on the part of the railroads, the shippers and the receivers of freight, to the end that the highest possible efficiency may be secured from the available facilities. I agree with the view that the carriers ought to take hold of the situation vigorously and place plenary power in the hands of a committee to change their car service rules from time to time and in various sections of the country as may be appropriate to meet the unusual conditions.

While I have felt impelled to dissent from the majority view, I shall not undertake further to elaborate my objections.

I am authorized to say that Commissioners Clements and Hall concur in this dissent.

Railroad Officers' Report

In an appendix to the report are printed the codes of car service and per diem rules of the American Railway Association, and various circulars issued by the American Railway Association in connection with the car situation, also a special report of individual members of the commission on car service to the members of the executive committee of the American Railway Association, dated at New York on January 11, and signed by W. L. Park, vice-president of the Illinois Central; E. J. Pearson, vice-president of the New York, New Haven & Hartford, and W. A. Worthington, vice-president of the Southern Pacific. This report reviews the work of the Car Service Commission, and in a temperate analysis of the difficulties which have been encountered in dealing with the freight car problem, it points out the absolute importance of complete confidence and co-operation between the railroads—every member of the A. R. A.—and the Interstate Commerce Commission, and concludes as follows:

"If the Interstate Commerce Commission can be convinced that the railways themselves can successfully cope with any situation that may arise with respect to car shortage or redistribution of cars so that shippers everywhere throughout the country may have equal opportunity in the use of equipment and so that the shippers on a few railways may not receive undue advantage, the American Railway Association will be permitted by the Interstate Commerce Commission to retain control of the situation. It is essential, however, that the Interstate Commerce Commission shall be made to feel that the railway representatives who may be selected to cooperate with it will be clothed with the necessary authority to enforce their acts and that they should be put in a position to reach a prompt and final decision on matters which may be brought up with them from time to time by the Interstate Commerce Commission.

"The members of the Commission on Car Service consider it their duty to inform the executive committee that, in their opinion, we are confronting a serious crisis. The transfer of the headquarters of the Commission on Car Service from Washington to New York would undoubtedly have been entirely satisfactory to all members of the Commission on Car Service had the change met with the full acquiescence of Commissioner McChord and the other members of the Interstate Commerce Commission and if Mr. Dow continued to sit with the railway representatives here. From all information it has been possible to gather, the change in location is very unsatisfactory to Commissioner McChord, and there is no hope of either himself or Mr. Dow attending our future sessions. It would be unprecedented for the Interstate Commerce Commission to turn over this duty to some other commissioner in the hope that he would serve on the committee of railway representatives.

"The members of the Commission on Car Service feel that the results already accomplished are worthy of the support and commendation of the American Railway Association, but have grave doubts of the efficacy of the future efforts of any railway committee acting independently without the cordial co-operation of the Interstate Commerce Commission. It is not to be expected that that commission will drop its own investigation, and it is much to be regretted if complaints which will continue to come directly to the Interstate Commerce Commission may be handled by that commission's inspectors without reference of such matters to the Commission on Car Service. Misunderstandings of conditions, which might otherwise be easily explained, are bound to occur, and the final result of the dissociation may be the issuance of drastic orders that might possibly be prevented through the close association that should exist between the work of the Commission on Car Service and that of the Interstate Commerce Commission with respect to the same subject matter."

KANSAS CITY SOUTHERN PROTESTS AGAINST TENTATIVE VALUATION

The Kansas City Southern in its own behalf and on behalf of its proprietary and subsidiary companies has filed a protest with the Interstate Commerce Commission against the tentative valuation of the properties recently given out by the commission. This company has established a valuation department and has ascertained for itself the various values and elements of value required to be ascertained by the commission in accordance with the valuation act, and its protest makes comparisons between its findings and those of the commission.

In the first place, it is stated that the commission has exceeded its power and jurisdiction in undertaking to make the tentative valuation at this time, on the ground that the commission has not yet reported the original cost to date nor "other values and elements of value," although they are susceptible of ascertainment, and that the compilation of this data is a condition precedent to the jurisdiction of the commission to make a tentative valuation. The carrier, therefore, prays that all further proceedings be suspended until the commission shall have first determined the original cost and other values and elements of value as required by the act. The carrier protests that the tentative valuation "is nothing more than an imperfect and incomplete compilation by the division of valuation of an alleged cost of reproduction less depreciation of certain parts or items of the carrier's properties, adopted by the commission pro forma and without any independent investigation, consideration and judgment on its part, and promulgated by it as a tentative valuation." It further protests that the commission as an administrative body has not yet undertaken to consider, determine and formulate the fundamental rules and principles which necessarily control the valuation of the carrier's property, nor has

it yet undertaken to ascertain and determine all the essential facts and circumstances surrounding the carrier's properties upon which its value must necessarily depend.

The carrier also protests against the selection of its valuation date, June 30, 1914, on the ground that the cost of labor and the current market prices of lands and materials applicable to a valuation as of June 30, 1914, was unusually low and has since so increased that the increase in the cost of reproduction new of the carrier's property between June 30, 1914, and December, 1916, is approximately from 25 to 40 per cent.

In protesting against the failure of the commission to report the original cost to date, the carrier offers to furnish to the commission in such manner, at such time and with such detail as it may direct, the full, complete and competent facts establishing the original cost to date. It is stated that so much of the original cost as consists of cash expenditures on account of construction and betterments, plus a contractor's profit, has been actually ascertained as $50,915,655. To this item are added additional items which the carrier insists are properly a part of the original cost to date as follows: One-twelfth of the expenditures in producing the properties of the Kansas City Terminal Railway, $3,290,595; one-fourth of the actual expenditures for the terminal properties of the Joplin Union Depot, $178,425; working capital, $1,050,868; materials and supplies on hand, $854,537; adaptation and solidification, $1,664,000; the amount expended by the carrier properly chargeable to capital account upon property abandoned, $2,324,704; the cost of constructing the canal of the Port Arthur Canal & Dock Company, which was conveyed to the Federal Government, but is used by the carrier as fully and freely as though owned by it, $1,023,982. This makes a total of $61,302,770. A computation of the original cost to date arrived at by the inventory method is also given with a total of $54,826,682, to which are added the additional items stated in connection with the other method, making a total of $65,213,798.

In comparison with the tentative cost of reproduction new as stated by the commission, $50,750,630, the carrier presents a compilation of the reproduction cost as determined by it amounting to $81,385,489, to which it also adds $7,672,061 for items which the commission has not included, making a total of $89,057,550.

The railroad protests against all items which enter into and are made a part of the tentative reproduction cost as wholly inadequate and insufficient in amount. It is also asserted that the rules, principles and methods which have been employed by the division of valuation and by the commission are erroneous and unwarranted by law; also that the commission has failed to include in its computation many items of property, both tangible and intangible, which are of great value and should have been included.

Specific protests are made against the methods used in obtaining the various items under the head of cost of reproduction, and it is asserted that the tentative reproduction cost as reported fails to include the interest of the Kansas City Southern in the property of the Kansas City Terminal Railway, its interest in the Joplin Union Depot, the cost of materials and supplies, cost of working capital, adaptation and solidification, trackage rights over other railroads and contingencies. Objection is also made to the tentative costs of reproduction less depreciation. The company contends that its property has been continuously maintained and is now being maintained at a high standard of efficiency by the continuous making of current repairs and by the replacement whenever necessary of perishable parts, so that considered as an entirety it has suffered no depreciation and hence none should be deducted from its cost of reproduction new. In the tentative valuation $8,015,454 was deducted for depreciation.

In the protest against the tentative valuation of lands it is stated that the commission has failed to report the cost of reproduction, the present cost of acquisition, or the original cost of acquisition. It is stated that the figures purporting to represent the present value of the carrier's lands are not only much less than the value on the valuation date, but in many instances are much less than the actual cost of such lands incurred a long time ago. Protest is also made because the present value of land was arrived at by applying an alleged unit value for general purposes of adjoining and adjacent lands, without allowance for the added expense of obtaining such land for railroad purposes. It is claimed that the aggregate naked land value was not less than $9,706,978, and that the present cost of acquisition was not less than $14,997,939, as compared with $4,478,267 reported by the commission.

Among the other values and elements of value which the carrier asserts should be taken into consideration are mentioned (a) that element of value which results whenever the separate articles of physical property constituting a railroad are joined together by a unity of ownership and use, (b) going concern value, (c) that element of value which represents the future as well as the present earning capacity of the property, (d), an element of value resulting from economy of operation, (e) an element of value represented by franchises and privileges.

"In other words," it is stated, "the valuation of railway property is a practical conception. The purpose was to ascertain the physical value of the properties and also those intangible elements of value which would influence a purchaser of the property in determining the price he would pay for it and which would likewise influence the seller and determine what he was entitled to receive for it."

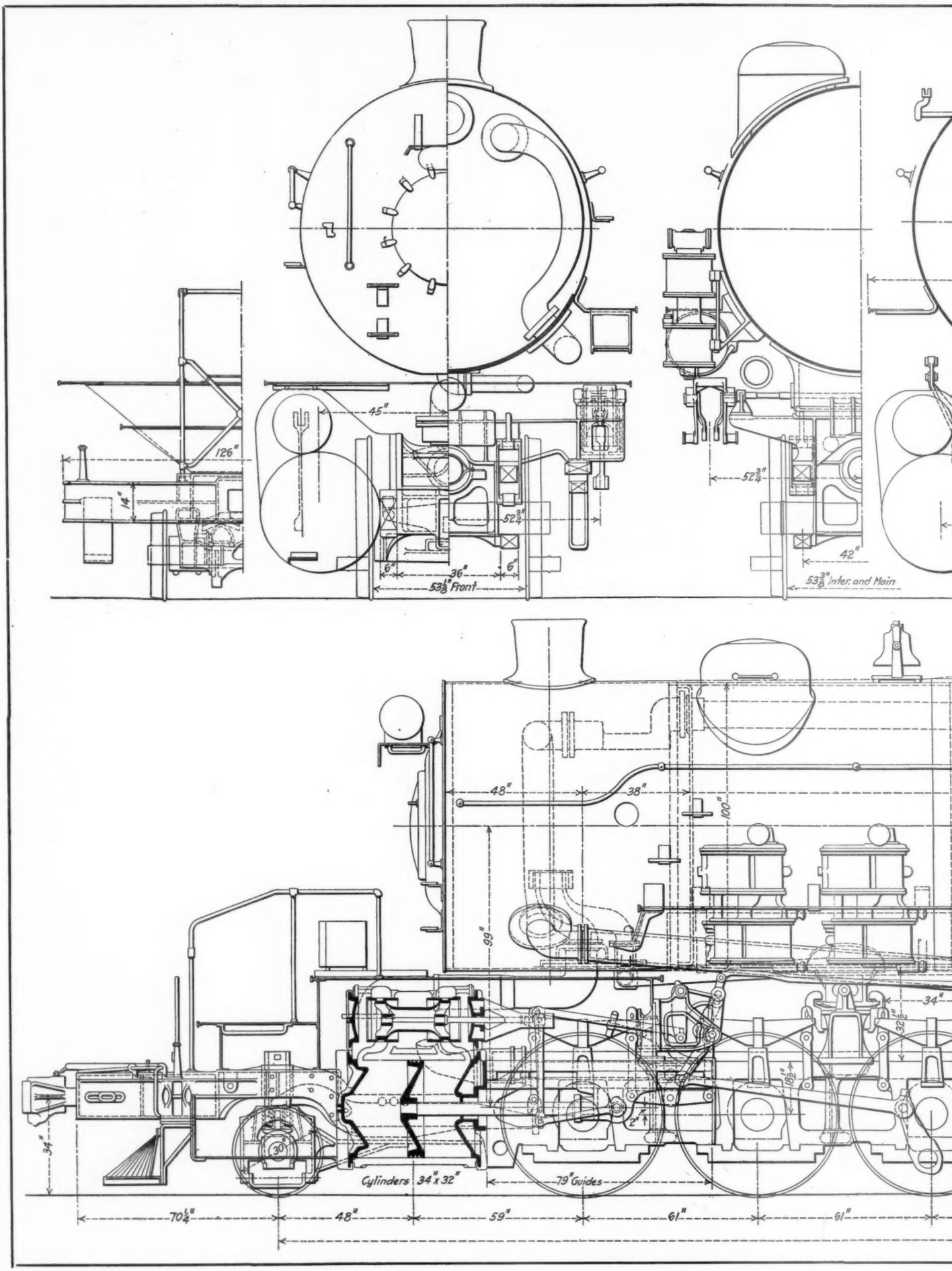
It is stated that the aggregate market value of the stocks, bonds and other securities of the company which represent all interest in its properties computed upon the average market values for the five years next preceding June 30, 1914, is $62,173,595 and that no value can fairly or properly be made which shall be less than this amount, but, on the contrary, such value should be a much larger sum because the market value of securities of railways during the past ten years has been unduly depressed. It is stated that the value of the franchises and privileges of the carrier has been taxed for years in the states of Missouri, Arkansas and Texas and on the basis of the Missouri assessment would aggregate $19,663,488.

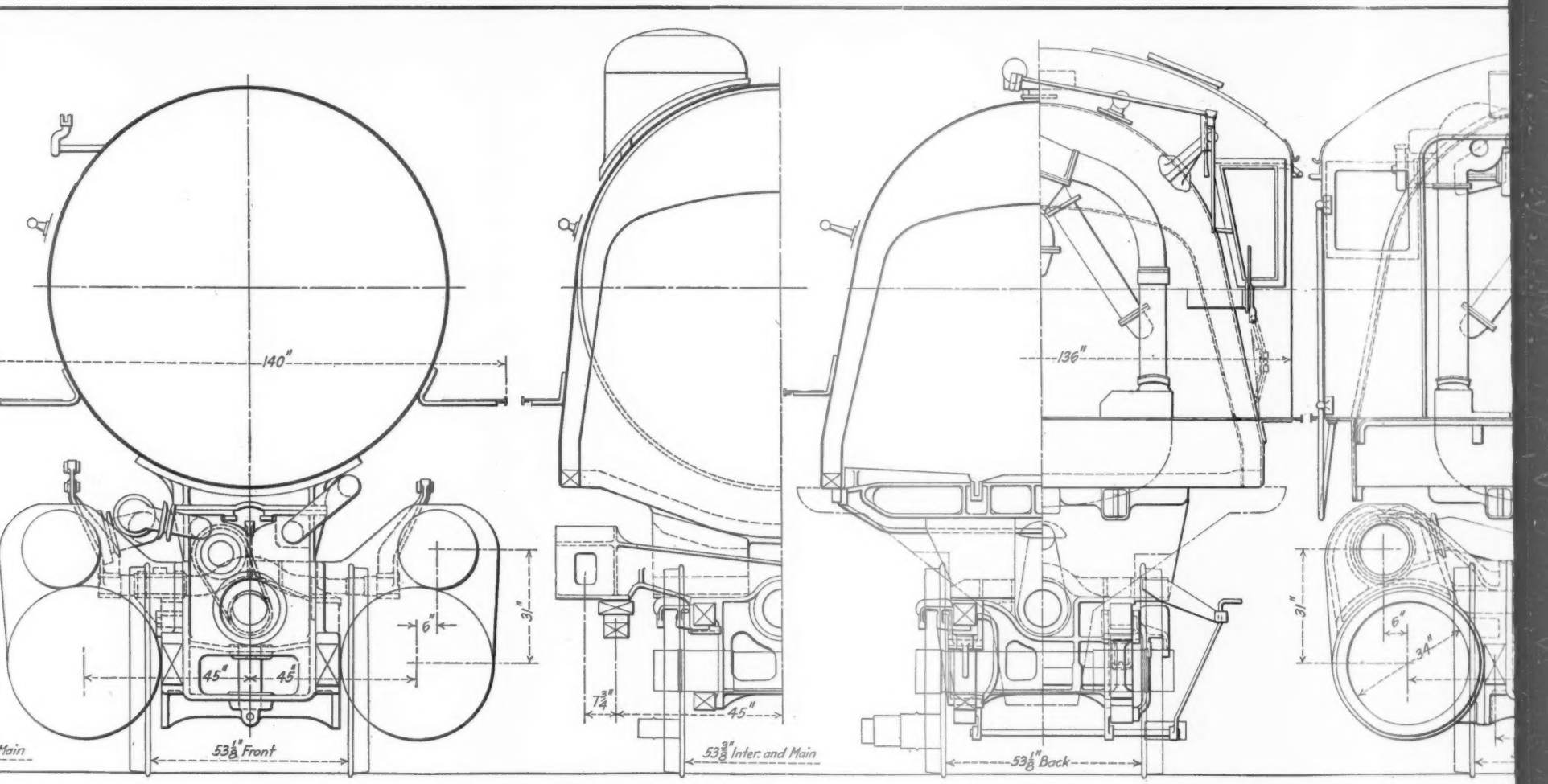
The carrier prays that it may be permitted hereafter from time to time to amend its protest in the correction of details in computations, if necessary, and to make further protests and further prays that the commission grant it an opportunity to produce testimony and introduce evidence for the purpose of proving its claims. The statement of the protest occupies 71 printed pages and there are approximately 200 additional pages of exhibits.

The Public Utilities Commission of Kansas has also filed a protest against certain methods used in obtaining the valuation.

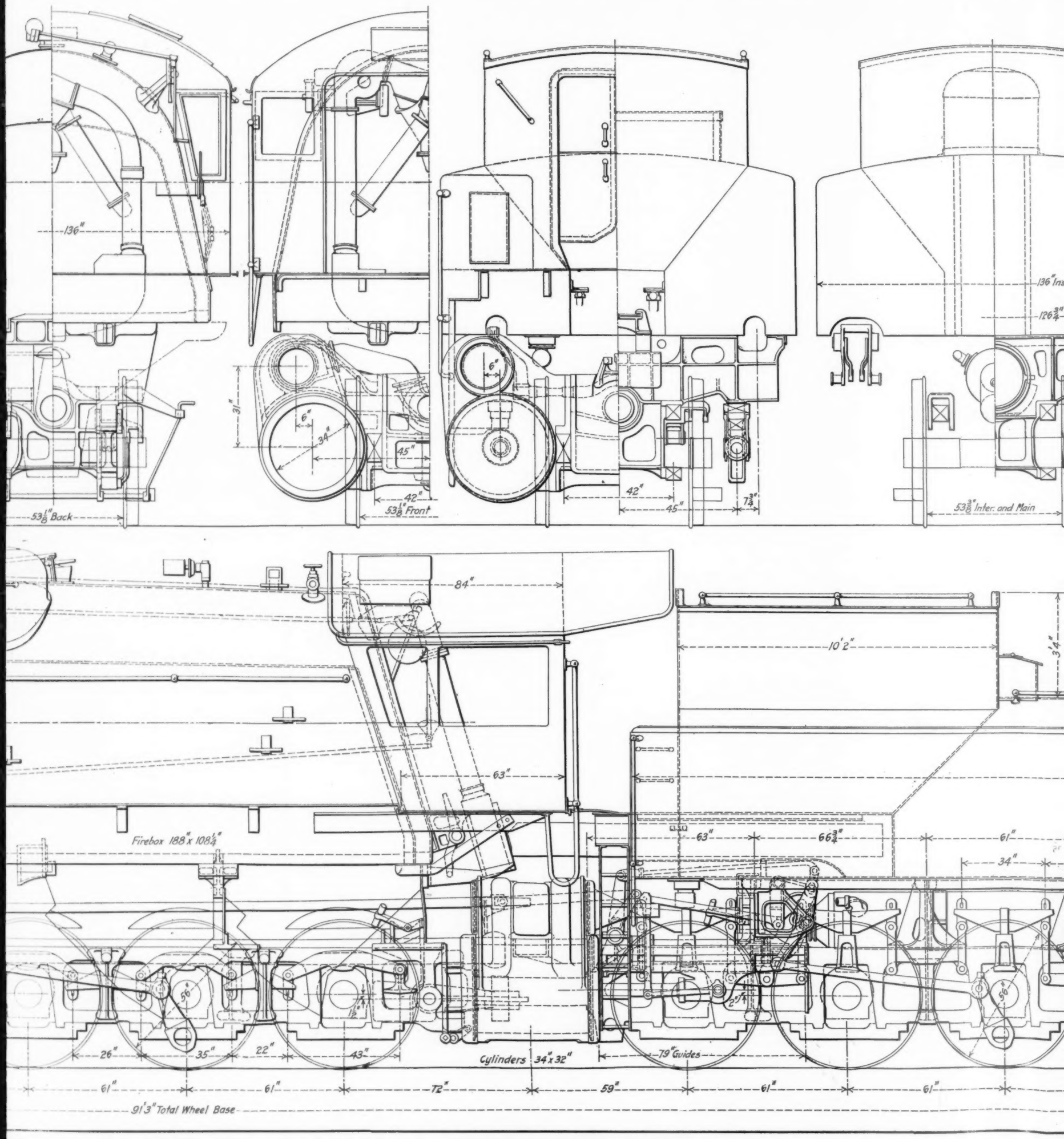
AUSTRALIAN RAILWAY DEVELOPMENT.—The Premier of New South Wales has introduced a bill which provides for the construction of a line from Moamba to Moulamein, 82 miles in length, at a cost of £345,000 ($1,676,700), exclusive of land and rolling stock; and another line of the same length from Kerang to Balranald, at a cost of £376,000 ($1,827,360).

GOLD COAST GOVERNMENT RAILWAY MILEAGE.—According to the report of the Gold Coast Colony Government Railway for 1915 it has 245 miles of line open for public traffic, consisting of the trunk service between Sekondi and Coomassie and the Tarquah-Prestea-Broomassie branch and the waterworks line, altogether 190 miles, and the separate lines from Accra to Koforidua, 55 miles.

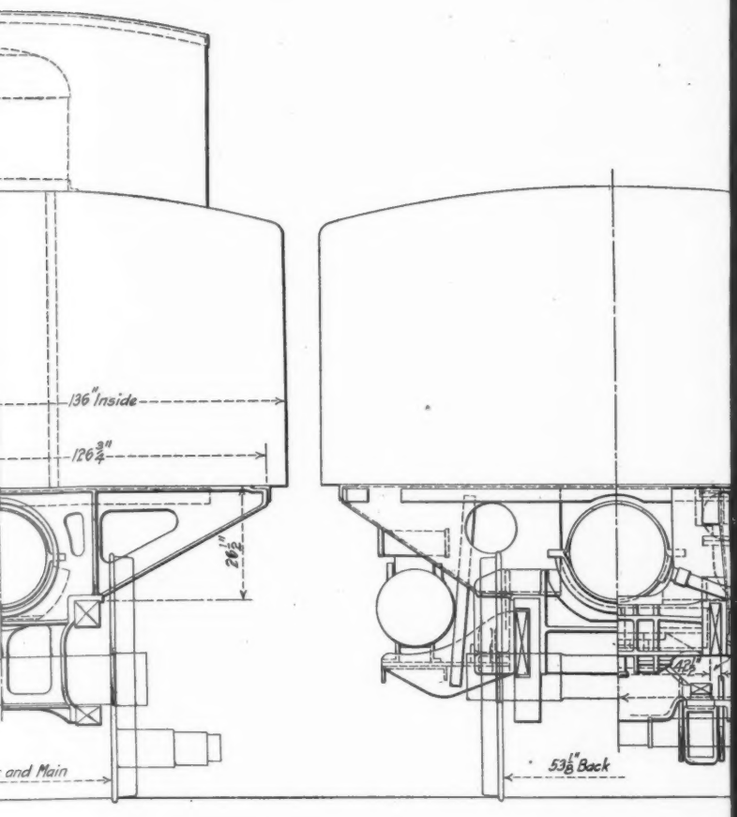

45"
126"
14"
52¾"
6"
36"
6"
53⅛" Front
52¾"
42"
53⅜" Inter. and Main
48"
38"
100"
99"
34"
32½"
34"
Cylinders 34" x 32"
79" Guides
70¼"
48"
59"
61"
61"

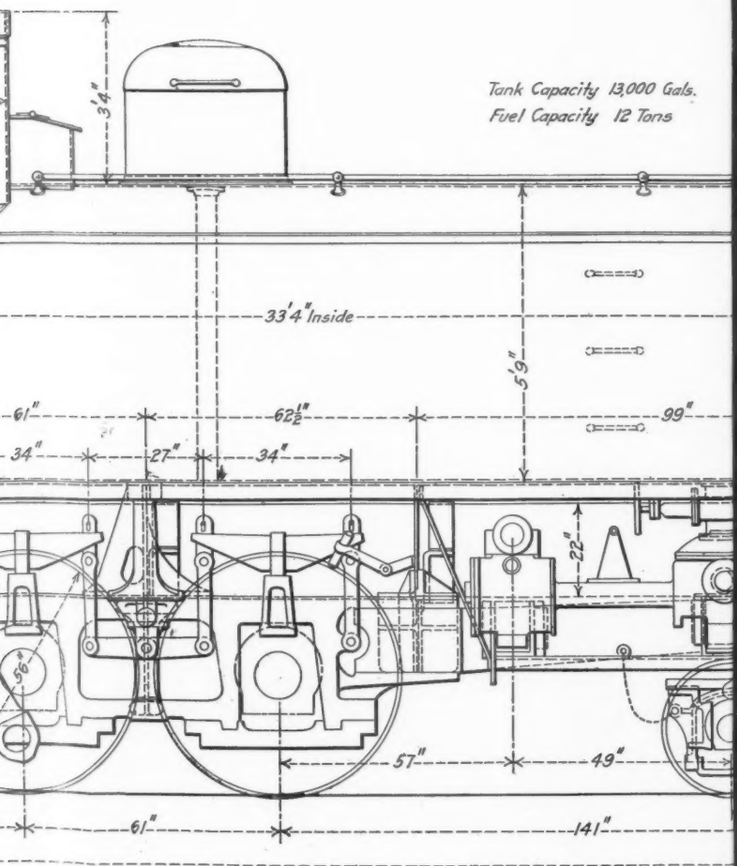


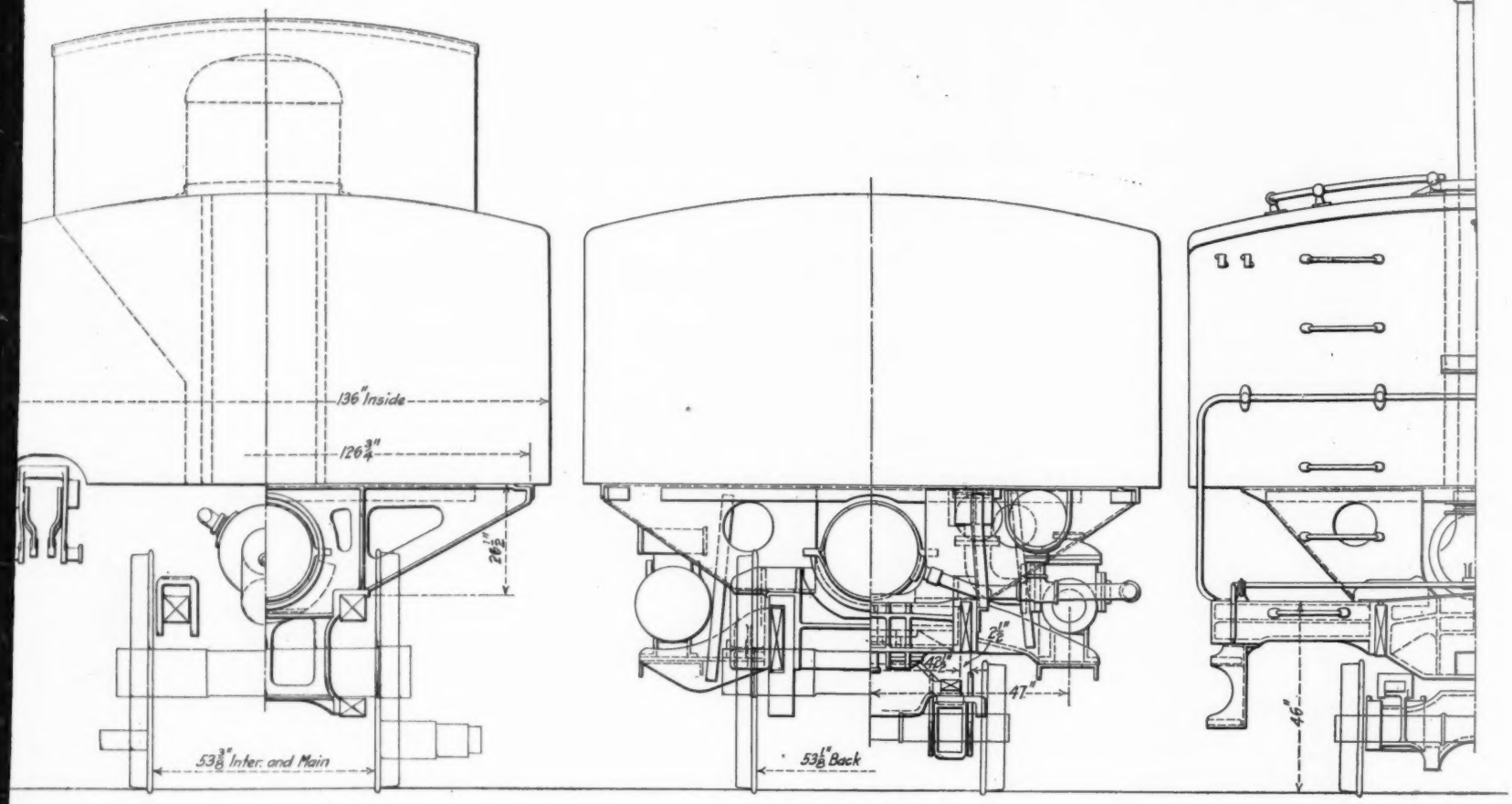
Triplex Compound Locomotive Built by the Baldwin Locomotive Works for the Virginian Railway; Total Weight, 844,

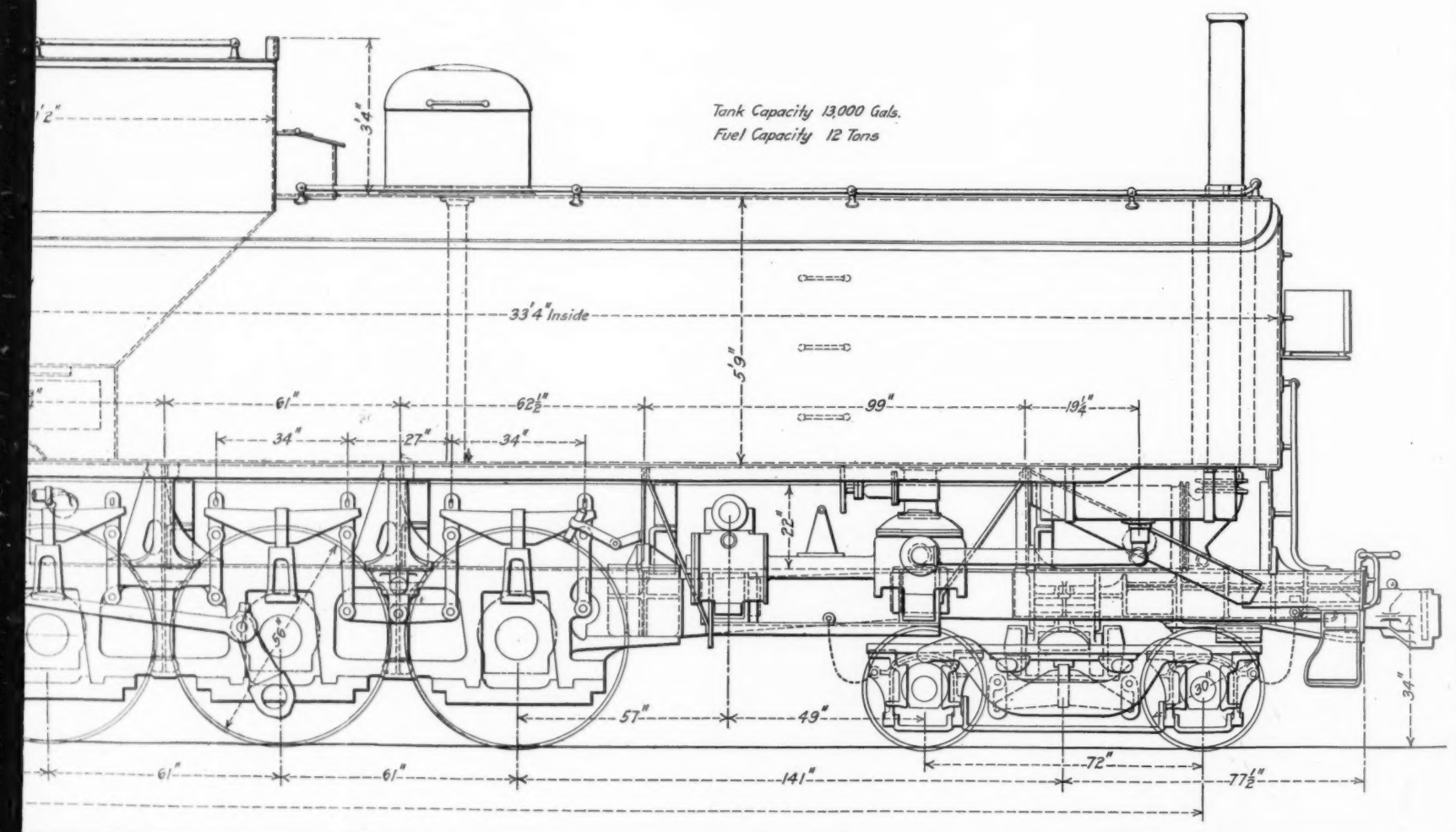


motive Works for the Virginian Railway; Total Weight, 844,000 lb.; Theoretical Tractive Effort, 166,300 lb.


136" Inside
126 3/4"
26 1/2"
and Main
53 1/8" Back


3'4"
Tank Capacity 13,000 Gals.
Fuel Capacity 12 Tons
33'4" Inside
5'9"
61"
62 1/2"
99"
34"
27"
34"
22"
57"
49"
61"
141"


136" Inside
126¾"
26½"
53⅜" Inter. and Main
53⅛" Back
42½"
2½"
47"
46"

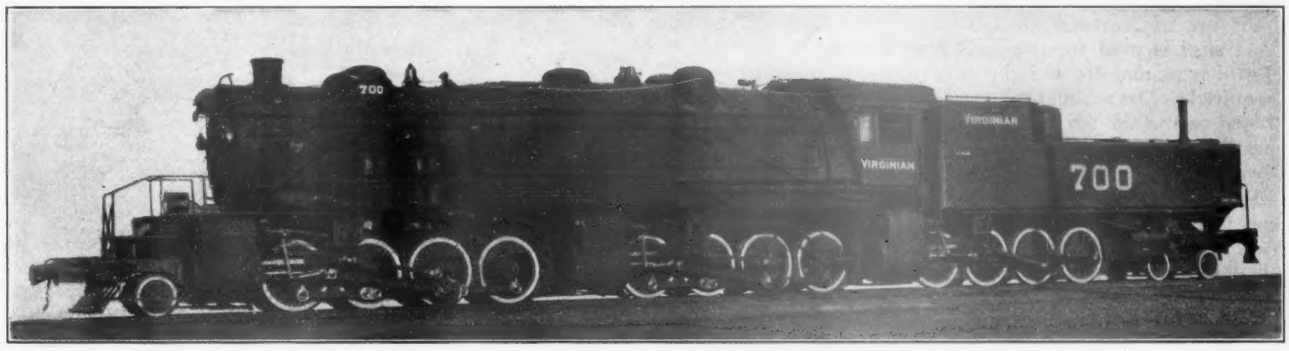

Tank Capacity 13,000 Gals.
Fuel Capacity 12 Tons
3'4"
33'4" Inside
5'9"
61"
62½"
99"
19¼"
34"
27"
34"
22"
56"
57"
49"
30"
34"
61"
61"
141"
72"
77½"

Virginian Triplex Type Pusher Locomotive

Total Weight 844,000 Lb.; Maximum Tractive Effort 166,000 Lb.; Equivalent Heating Surface 11,209 Sq. Ft.

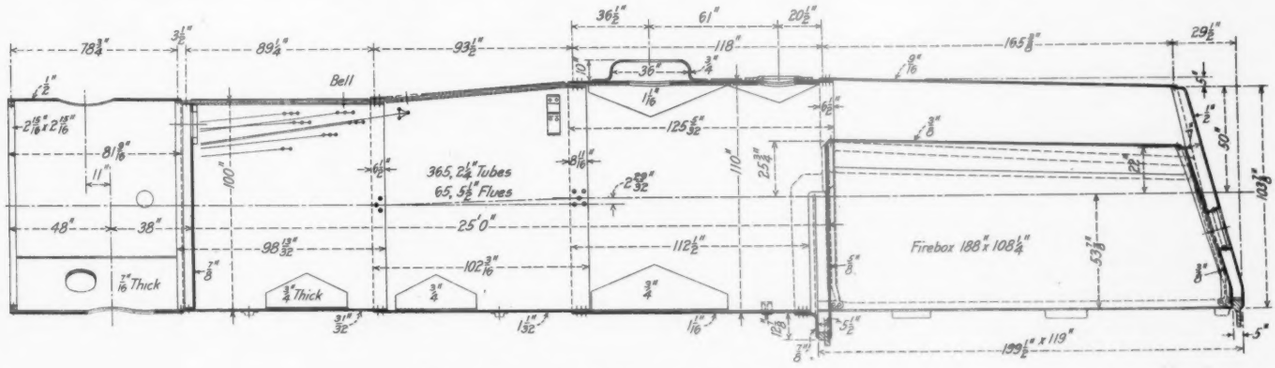
A TRIPLE articulated compound locomotive, with 2-8-8-8-4 wheel arrangement, has recently been built by the Baldwin Locomotive Works for the Virginian Railway. As far as the general principles of its design are concerned, this locomotive is similar to the Erie Triplex locomotives, which have now been in service a sufficient length of time to demonstrate the value of the type in heavy grade work. The Virginian locomotive exerts a maximum tractive effort of 166,300 lb. and was designed with a height limit of 16 ft. 10 in., and a width limit of 12 ft. at a height of 2 ft. 3 in. above the rail. The center line of the boiler is placed 10 ft. 9 in. above the rail. Flanged tires are used throughout, the lateral play between rails and flanges being 7/8 in. on the front and back drivers of each group, and 5/8 in. on the main and intermediate pairs. The locomotive is turned on Y's, on which the curvature is 18 deg.

The boiler is of the wagon top type, with an outside diameter of 110 in. at the third ring. Both the main and auxiliary domes are mounted on this ring, the latter being placed over a 15-in. opening in the shell. The longitudinal seams are all placed on the top center line. That on the dome ring is welded throughout its entire length, while the seams on the first and second rings are welded at the ends. The circumferential seam uniting the second and third rings and the seam uniting the third ring with the throat and outside firebox sheets are triple riveted. The back tubesheet is straight, and the tubes have a length of 25 ft.



The Virginian Triple Articulated Locomotive

The throttle is of the Rushton type, designed to suit the restricted clearance limits. The dome is 10 in. high and 36 in. in diameter; the opening in the shell measures 20 in. longitudinally by 28 in. transversely. The throttle valve is seated immediately over this opening, and on the throttle pipe is cast a supporting bracket which is bolted to the boiler shell. The valve is lifted by a transverse rotating rod, which passes through a stuffing box in the side of the boiler below the dome and has an outside connection with the throttle lever. The latter is placed in a vertical position, and is designed to give maximum leverage and slowest travel of the valve at the beginning of its movement.



Boiler of the Virginian Triplex Locomotive

The furnace is of the Gaines type, and the arch is supported on five tubes. As the firebox is placed above the middle group of driving-wheels, the space available for the throat

The superheater header is of cast iron, in one piece, and

is designed for a 65-element superheater having 2,059 sq. ft. of heating surface. The superheated steam pipes leading back to the high pressure cylinders are fitted with slip joints, and the right hand pipe has a connection, through a suitable cast steel elbow, with the Simplex starting valve. This valve is located in the high pressure cylinder saddle.

When working compound the two high-pressure cylinders exhaust into a common chamber, which communicates with the front and back receiver pipes. In starting, the intercepting valve is in such a position that live steam enters both the front and back receiver pipes, as well as the high-pressure cylinders; the high-pressure exhaust being conveyed to the smokebox through a separate pipe, which terminates in an annular nozzle surrounding the main nozzle. Both the main and auxiliary nozzles have removable thimbles. The intercepting valve is so arranged that, by admitting steam through a pipe connection from the cab, the locomotive can be worked single expansion at any time. When drifting, saturated steam can be admitted to the high-pressure cylinders through a pipe connected with a lever valve in the cab.

The high-pressure cylinder saddle is made in two pieces, the upper of which is riveted to the boiler shell, while the lower is cored out for the intercepting valve and pipe connections. All six cylinders are cast from the same pattern; they are of vanadium iron, so designed that bushings ¾-in. thick can be applied subsequently if desired. The pistons have dished heads of forged steel, with cast iron bull rings held in place by electrically welded retaining rings. The piston rods are of Nikrome steel, without extensions. Vanadium cast steel is used for the cross-head bodies; they are of the Laird type, and are as light as is consistent with the strength required. The main crank pins are of Nikrome steel, hollow bored, while the main and side rods and main driving axles are of chrome-vanadium heat treated steel. Vanadium steel is used for the driving tires and also for the springs. The valve motions are of the Baker type, controlled by the Ragonnet power reverse mechanism.

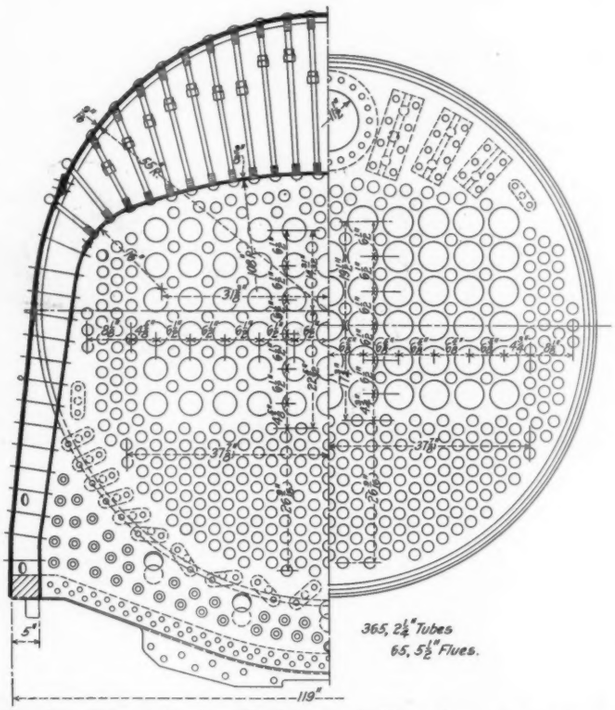
The frames are of vanadium steel castings, 6 in. in width. The radius bars at the two articulated frame connections are attached to horizontal transverse pins, and are fitted with case-hardened spherical bushings which embrace the hinge pins. This construction provides flexibility in a vertical as well as a horizontal plane, and prevents binding at the hinge pins when passing over sudden changes in grade or poorly surfaced track. It has been used by the builders in a number of recent Mallet locomotives. The structural details include a number of steel castings of unusual design. The waist bearers supporting the forward part of the boiler barrel, for example, and the three guide bearers are all bolted to both the upper and lower frame rails, and constitute most effective transverse frame braces. The front bumper beam and deck plate are combined in a large steel casting, furnished by the Commonwealth Steel Company and designed to house the Miner A-59 draft gear. This style of draft gear is also used at the back end.

The tank is 33 ft. 4 in. long, 11 ft. 4 in. wide and 5 ft. 9 in. deep inside. It has a capacity of 13,000 gals. The top is rounded to a radius of 22 ft. 1 in. and the top and side sheets are joined by a plate which is bent to a 3-in. radius. This provides a neat finish, and makes it impossible for water to accumulate on top of the tank. Supports for the tank are provided by the guide bearer of the rear engine, by two cast steel bearers placed respectively between the second and third and the third and fourth pairs of wheels of the rear groups, and by three bearers composed of ½-in. plates, which are placed over the rear frame extensions.

The exhaust steam from the rear cylinders passes through a feed-water heater, which is placed under the tank, and consists of a long drum 22 in. in diameter. The exhaust steam passes through 31 tubes, 2¼ in. in diameter, which traverse the drum, 437 sq. ft. of heating surface thus being provided. The feed-water is handled by a Blake & Knowles piston pump, which is placed between the tank and the heater. The pump is located under the tank, back of the rear driving wheels. This arrangement requires a flexible connection in the steam line leading to the pump, but as only cold water is handled, the pump is far more reliable in service than it would be if placed between the heater and the boiler, where hot water would have to be handled. The locomotive is also provided with two injectors for use in cases of emergency.

The tank is of such length that it extends considerably beyond the rear driving wheel base, and the weight of the overhang is carried by a four-wheel, constant resistance engine truck of the Economy type. This truck has a total swing of 13¼ in., and the load carried by it is equal to the total weight of an express passenger locomotive of 30 years ago. The two-wheel leading truck is of the Economy type also.

Attention should be called to the sanding arrangements used on this locomotive. There are four sand boxes placed right and left over the boiler, two for the forward group of wheels and two for the middle group. Sand for the rear group is carried in a box, which is placed on top of the tank.



Section Through the Firebox and Elevation of the Front Tube Sheet

The pipes from this box are run to the bottom of the tank through two vertical pipes 4½ in. in diameter. The sanders are of the Graham-White "Perfect" type and are 12 in number, six for sanding forward and six for sanding backward. In connection with the sanding equipment, rail washers are placed at each end of the locomotive, and a specially designed valve in the cab controls the supply of sand and washing water simultaneously. When the handle of this valve is turned in one direction, sand is delivered under the front drivers of each group and water is discharged through the washing pipes at the rear; while if the handle is turned in the opposite direction, sand is delivered under the rear drivers of each group and water is discharged through the front washing pipes. Suitable nozzles are also provided with the Sanders for blowing out the sand traps and their pipe connec-

tions by means of compressed air. Flange oilers are applied to the front and rear driving wheels in each group.

The cab is roomy and the fittings are conveniently arranged. The front wall of the cab is sloped to follow the inclination of the back-head, in order to provide ready access to the stay-bolts. The cab equipment includes a pyrometer and a low water alarm. The advantage of a power reverse mechanism, as far as simplifying the arrangement of the cab fittings is concerned, is most apparent in a locomotive of this size.

Where practicable, the railway company's standard details have been used in this locomotive. The driving tires and driving boxes interchange with those of the Class M-C Mikado type locomotives, which are used in heavy freight service on the low grade sections of the line.

The principal data and dimensions are as follows:

General Data

Gage	4 ft. 8½ in.
Service	Pusher
Fuel	Soft coal
Tractive effort	166,300 lb.
Weight in working order	844,000 lb.
Weight on drivers	726,000 lb.
Weight on leading truck	36,000 lb.
Weight on trailing truck	82,000 lb.
Weight of engine and tender in working order	844,000 lb.
Wheel base, driving	67 ft. 7 in.
Wheel base, rigid	15 ft. 3 in.
Wheel base, total	91 ft. 3 in.

Ratios

Weight on drivers ÷ tractive effort	4.4
Total weight ÷ tractive effort	5.1
Tractive effort × diam. drivers ÷ equivalent heating surface*	829.3
Equivalent heating surface* ÷ grate area	103.6
Firebox heating surface ÷ equivalent heating surface,* per cent	3.2
Weight on drivers ÷ equivalent heating surface*	64.8
Total weight ÷ equivalent heating surface*	75.3
Volume both cylinders	46.3 cu. ft.
Equivalent heating surface* ÷ vol. cylinders	242.1
Grate area ÷ vol. cylinders	2.3

Cylinders

Kind	Compound
Diameter and stroke (six)	34 in. by 32 in.

Valves

Kind	Piston
Diameter	14 in.

Wheels

Driving, diameter over tires	56 in.
Driving, thickness of tires	3½ in.
Driving journals, diameter and length	11 in. by 13 in.
Engine truck wheels, diameter	30 in.
Engine truck, journals	6½ in. by 14 in.
Trailing truck wheels, diameter	30 in.
Trailing truck, journals	6½ in. by 14 in.

Boiler

Style	Wagon top
Working pressure	215 lb. per sq. in.
Outside diameter of first ring	100 in.
Firebox, length and width	188 in. by 108¼ in.
Firebox plates, thickness	Sides, back and crown, ⅜ in.; tube, ½ in.
Firebox, water space	Front, 5½ in.; sides and back, 5 in.
Tubes, number and outside diameter	365—2¼ in.
Flues, number and outside diameter	65—5½ in.
Tubes and flues, length	25 ft.
Heating surface, tubes and flues	7,689 sq. ft.
Heating surface, firebox	359 sq. ft.
Heating surface, arch tubes	72 sq. ft.
Heating surface, total	8,120 sq. ft.
Superheater heating surface	2,059 sq. ft.
Equivalent heating surface*	11,209 sq. ft.
Grate area	108 sq. ft.

Tender

Water capacity	13,000 gal.
Coal capacity	12 tons

* Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.

WASHINGTON CORRESPONDENCE

WASHINGTON, D. C., January 23, 1917.

LABOR BILLS IN CONGRESS

Congress has made so little progress during the short session which is now rapidly drawing to a close that President Wilson is making extraordinary efforts to secure action on the legislative program which he has recommended, including the proposed bills to prevent strikes, the provision for a reorganization of the Interstate Commerce Commission and the Webb bill to permit co-operative action by manufacturers to promote export trade. After he had made several visits to the Capitol to impress his wishes upon the House and Senate leaders, it was announced on Monday that he proposed to camp at the Capitol three afternoons a week hereafter until some results are accomplished. Both the Senate and the House committees have completed their public hearings on the labor bills, but strong opposition has been encountered both among the labor advocates and among the Progressive Republicans to the idea of prohibiting strikes pending an investigation, and scattering suggestions for a possible compromise have thus far made little impression. The railroads have taken no part in the public hearings, and while the labor organizations have been most outspoken in their criticism of the President's proposals, very little of a concrete nature has been suggested as an alternative. Representatives of the brotherhoods are not only indicating their distrust of the Adamson eight-hour law, but are now at the point of asking Congress to keep its hands out of their affairs.

The Senate steering committee has called a Democratic caucus for Thursday evening to pass on a tentative legislative program which will include the railroad bills.

The House Committee on Interstate and Foreign Commerce completed its hearings on Tuesday, after having heard Samuel Gompers, president of the American Federation of Labor; H. B. Perham, president of the Order of Railroad Telegraphers; W. G. Lee, president of the Brotherhood of

Reproduced by Permission from the Saturday Evening Post

Not a Moment to Lose

Railroad Trainmen; W. S. Carter, president of the Brotherhood of Locomotive Firemen and Enginemen; W. S. Stone, grand chief of the Brotherhood of Locomotive Engineers, and L. E. Sheppard, acting president of the Order of Railway Conductors, in opposition to the proposed Adamson bill. The brotherhood officers not only opposed emphatically the idea of prohibiting strikes pending an investigation, but also opposed that section of the bill introduced by Mr. Adamson limiting the working hours of train crews to eight hours. At the opening of the hearing on Friday morning Chairman Adamson announced that the speakers need not address themselves to the proposed legislation for an eight-hour day, "because it had been put forward for a particular purpose which had been served," and that it was not the intention of the committee to consider it any further.

Mr. Lee read the committee a long statement opposing every feature of the new Adamson bill, saying that the train employees recognized that an absolute eight-hour day is impracticable in road service and that the 12½-mile-an-hour speed basis, which they had originally demanded did not require an absolute eight-hour day.

"A strict eight-hour day is out of the question and any practical railroad man knows it," he said, "but we believe the railroads can speed up their trains."

His principal objection to the bill was that it would tie the hands of the employees during the period of investigation, while the railroads would be free to do anything in their power to strengthen their position by preparing for a strike and that it would be impossible to prevent them from doing so.

"It is our right," he said, "to protect our own interests even if the public is inconvenienced and we propose to do what we can to oppose any action by the President or anyone else to enact a law to prevent railway employees from leaving the service."

He said the brotherhoods were not opposed to fair arbitration, but that the principle of arbitration and mediation "had been killed in the house of its friends," and that the Newlands arbitration law ought to be abolished as useless. He said that arbitration had been successful as long as it was administered by practical men, but that it had been a failure at the hands of neutral arbitrators unfamiliar with the technicalities involved. He insisted that the brotherhoods had not asked for the passage of the Adamson law, but had accepted it, thinking it had accomplished the purpose of their agreement with the President. Asked whether he would be in favor of repealing the Adamson law, he said he would be so far as his organization is concerned and that he wished he had never recalled the strike order last summer. Various members of the committee argued with Mr. Lee against his contention that a compulsory investigation law would amount to involuntary servitude, but Mr. Lee insisted on the preservation of the right to strike. Asked what he would suggest as an alternative, Mr. Lee proposed the creation of a permanent commission consisting of four representative men chosen from among the employees and four railroad officers to be appointed by the President and to sever their connection with their organizations, to investigate and make a public report of all controversies involving wages and working conditions. He was opposed to the idea of having such a board make a compulsory award, but thought there would be such confidence in its findings that a strike would never be called. One of the members of the committee asked if it would not be a good plan to include a provision that there should be no strike or lockout pending such an investigation. Mr. Lee said that any reference to lockouts might just as well be omitted, because there is no such thing in the railroad business, but he declined to assent to any provision prohibiting strikes. He said the fact that the brotherhoods had not yet struck after having been engaged in the present movement for over a year proves that a law against strikes is unnecessary, although he said he thought the railroads wanted a strike last summer to help them in getting an increase in rates.

Mr. Carter said that if the eight-hour provision were to be eliminated he could omit half of his speech. Mr. Stone and Mr. Sheppard appeared before the committee on Tuesday.

Judge Advocate General Crowder of the army and Solicitor General Davis appeared before the Senate committee on Thursday to discuss the provision of the bill authorizing the President to take over and operate railroads in time of military necessity. Both agreed that such a power would be constitutional.

Counsel for the railroads has filed a supplemental brief on the eight-hour law case in the Supreme Court in reply to that of the Department of Justice, which contended that the law contemplates putting into effect the 12½-mile speed basis demanded by the brotherhoods.

M. O. Lorenz, secretary of the eight-hour commission, of which General Goethals is chairman, has addressed a circular to the carriers asking them to keep records of the hours and wages of trainmen, which may be used for comparisons in case the Adamson law is sustained.

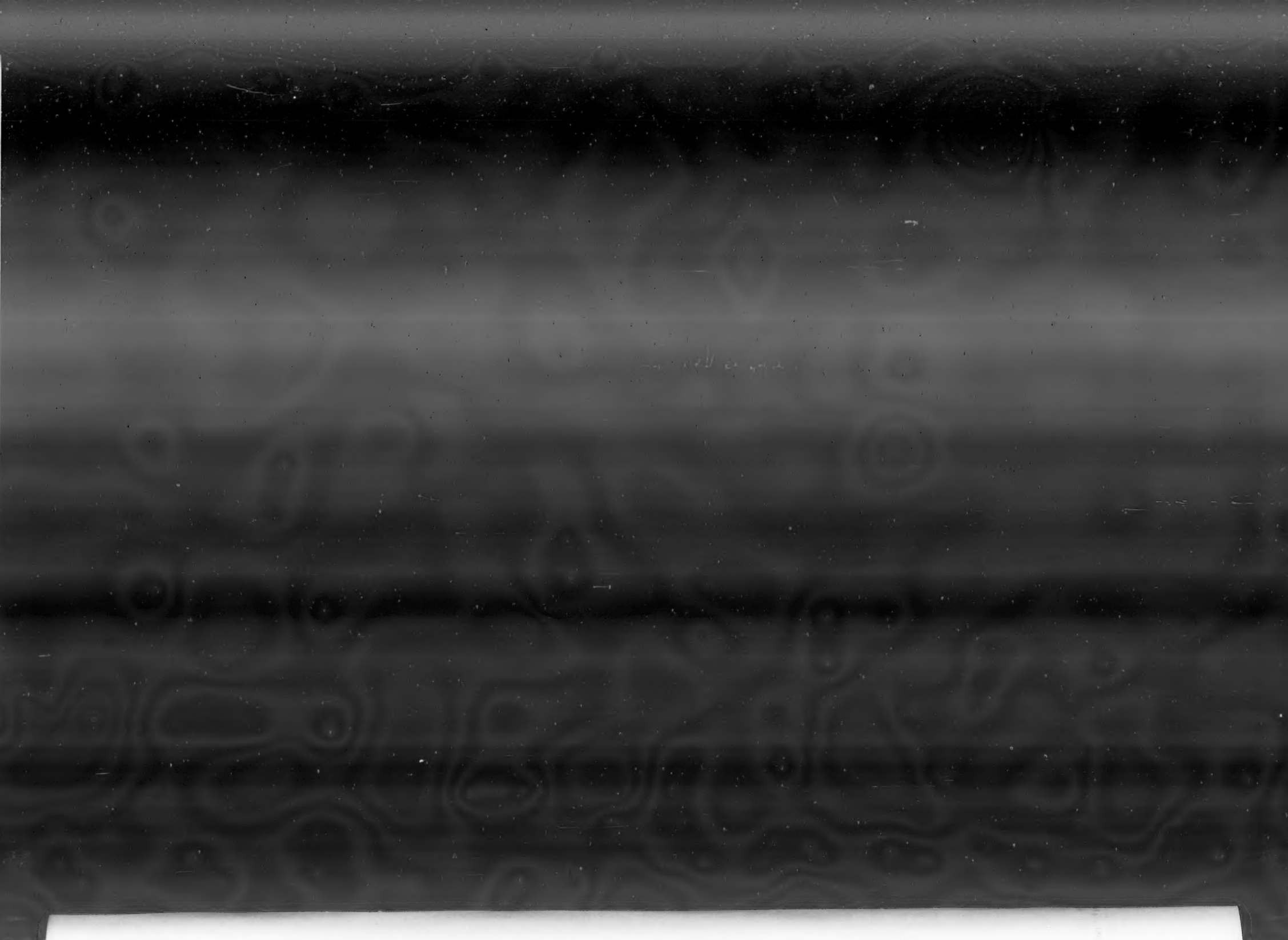
Commissioner Daniels and the Senate

Senator Norris of Nebraska on January 18 introduced in the Senate a resolution for an investigation by a committee of senators to ascertain the means by which Winthrop M. Daniels of the Interstate Commerce Commission obtained a copy of Senator Cummins' address in secret executive sessions of the Senate on January 3 and 6 in opposition to the confirmation of Mr. Daniels' reappointment. The resolution recited that the address was printed in confidence for the information of senators and that afterward and before the injunction of secrecy was removed by a vote of the Senate, Mr. Daniels prepared in writing a reply thereto, which reply was afterward printed in the Congressional Record and shows on its face that at the time of its preparation Mr. Daniels must have had in his possession a copy of Senator Cummins' address. The only reply to Senator Cummins' address which has been printed in the Congressional Record was a memorandum submitted by Senator Newlands, referred to in last week's issue, which was made public in the Record in connection with the publication of Senator Cummins' speech.

Senator Newlands promptly explained that he had furnished Mr. Daniels with a typewritten copy of Senator Cummins' speech and asked him to give him his views regarding it, communicating the fact to the senator from Iowa, and stating it in executive session of the Senate, and that Commissioner Daniels then prepared memoranda which Senator Newlands presented in the Senate after having very materially modified it himself. After several senators had expressed their opposition to the rule of the Senate requiring the expulsion of a member who disclosed executive proceedings, the question was considered in executive session for 1 hour and 40 minutes, the Norris resolution was tabled and another resolution referring it to the committee on rules was defeated by a vote of 50 to 7.

State Control of Irish Railways.—The figures on page 106 of the *Railway Age Gazette* of January 19 were transposed. The length of the Irish railways is 3,100 miles.

Railway Scrap as War Material.—The English Ministry of Munitions has extended the prohibition as to dealing without a permit in specified war materials to second-hand railway material, including locomotives and cars of all types, rails of all sections and types, chairs, fish-plates, fastenings, signal apparatus, ties and the like.

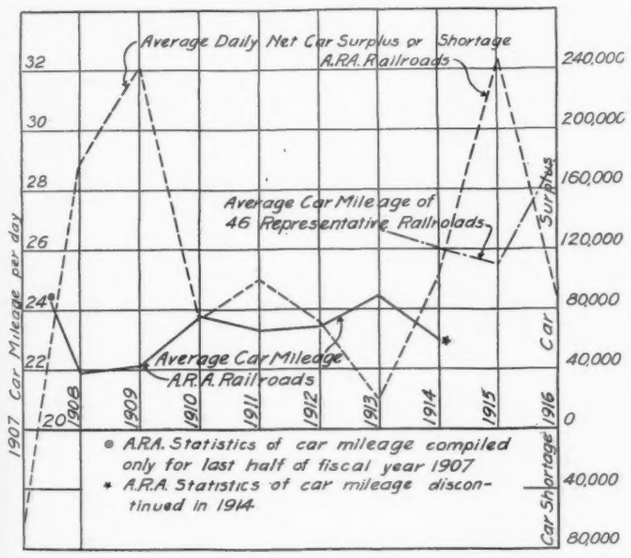


Statistics Show Increase of Freight Car Efficiency

Average Miles Per Car Per Day Breaks Record in Fiscal Year 1916, and Also in September and October Last

SINCE the beginning of the present period of car shortage the railroads of the United States have suffered much unjust criticism. A common charge against them is that they are running slower and heavier freight trains at the expense of the rapid circulation of equipment. Although it is true that American carriers are loading trains more heavily than ever before and are handling an unparalleled tonnage, they have also, during this period of car shortage, achieved the highest mileage per car per day in their history.

During the inquiry into the car shortage at Louisville, in November, 1916, Charles C. McChord of the Interstate Commerce Commission requested the railroads to prepare statistics of car mileage and car supply for the fiscal years, and for the months of September and October, 1913 to 1916, inclusive. Forty-six lines, with approximately 65 per cent of the total mileage of the country and serving all sections, have furnished to the *Railway Age Gazette* the same information on this subject they have sent the commission. This information shows that for the fiscal year ending June 30, 1916, the average car movement per day for these roads reached the high figure of 29.03 miles, as compared with 26.69 miles in 1913, the highest previous record. The average daily mileage per car in September, 1916, for these roads was 31.54, or 4.58 miles greater than the average for the same month in 1913. Only 35 railroads were able to give car mileage statistics for October, 1916. These made an average of 32.17 miles per car per day, a record even better than that of the previous month.



Car Supply and Car Mileage for Fiscal Years 1907 to 1916, Inclusive

Car mileage statistics for the railroads included in the membership of the American Railway Association are available for the fiscal years 1907 to 1914, inclusive. They show that the highest mileage per car in that period was made in the year ending June 30, 1913, when the average daily movement was 24.5 miles per day. In 1914 the increased number of idle cars resulting from business depression brought the average down to 23.7 miles. The average car mileage in the same years for the 46 lines for which we have more recent statistics was slightly greater than for all roads, being 26.69 miles in 1913 and 26.00 in 1914. It is safe to estimate that the average for all A. R. A. roads in 1916 shows relatively as great an increase as that of the roads for which we have data. The average for these 46 roads in 1916 being 29.03 miles per car per day, it is safe to assume that the average for all roads was at least 27.00 miles, or an increase of 2.5 miles over the previous record, that of the fiscal year 1913.

Car mileage can be taken as an index of railroad efficiency only when considered in connection with the demand for and supply of cars. In other words, the average mileage made per car per day is greatly influenced by the conditions as to car shortage or car surplus, and whether there is a shortage or surplus depends on the volume of traffic. Therefore, to ascertain whether there has been an increase in car efficiency, years of heavy business should be compared with other years of heavy business, and years of light business with other years of light business. On this basis the years 1916 and 1913 are comparable, both being years of heavy business. The average daily net surplus of cars in the fiscal year ending June 30, 1913, was 20,007, or less than 25 per cent of the average for 1916, which was 84,435. Whereas, there was only one month in 1916 when the records of the American Railway Association showed a net shortage of cars, the months of September, October, November and December, 1912, showed net shortages varying from 8,620 to 51,250. Furthermore, as heavy train loading is charged with causing slow circulation of cars, it is interesting to note that the statistics of the Interstate Commerce Commission show heavy increases in train loading during the time when these increases in miles per car per day were being secured. The average load per train in 1915 was 474.5 tons, an increase of 29.1 tons over 1913, and of 22.7 tons over 1914. The annual reports of 27 of the 46 lines, which have furnished their car mile statistics, indicate that at least as great an increase in train loading was achieved in 1916 as in the previous year. The average load per train for these 27 roads was 567 tons in 1916 and 516 tons in 1915, an increase of 51 tons. The statistics in detail are as follows:

Railroad.	Tons per Train. 1915.	1916.
Atchison, Top. & S. Fe	442	468
*Baltimore & Ohio	693	761
Boston & Maine	352	381
Chesapeake & Ohio	963	1,064
Chicago, Burlington & Quincy	581	658
Chicago Great Western	574	610
*Chicago, Milwaukee & St. Paul	390	425
Chicago, Rock Island & Pacific	380	406
Chicago & Alton	454	510
Chicago & Eastern Illinois	607	663
Chicago & North Western	443	491
*Great Northern	650	663
Illinois Central	523	59[illegible]
*Kansas City Southern	542	548
Minn., St. P. & S. Ste. M	396	463
Missouri, Kansas & Texas	364	391
Missouri Pacific System	483	524
New York, New Haven & Hartford	351	352
*Norfolk & Western	841	957
Northern Pacific	669	717
Seaboard Air Line	279	336
Southern System	382	442
Southern Pacific System	464	526
*St. Louis Southwestern	345	386
Toledo, St. Louis & Western	473	527
*Union Pacific System	555	608
Western Maryland	735	837

* Average load per train for revenue freight only.

Statistics of car mileage and car supply for the ten-year period from 1907 to 1916, inclusive, show a marked correlation. An increase in the number of idle cars is ordinarily accompanied by a decrease in average car mileage per day and vice versa, but the general tendency of car miles per day

is upward, as is shown by the following statistics for the fiscal years:

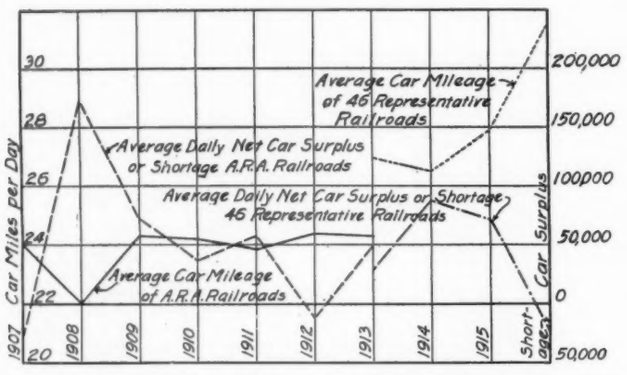
Year.	Average Daily Car Mileage. For A. R. A. Roads.	Average Daily Car Mileage. For 46 Lines.	Average Daily Car Surplus or Shortage. For A. R. A. Roads Only. Surplus.	Shortage.
1907*	24.3	.....	.....	70,000
1908	21.9	.....	178,189	.....
1909	22.1	.....	242,262	.....
1910	23.8	.....	76,569	.....
1911	23.3	.....	112,926	.....
1912	23.4	.....	72,456	.....
1913	24.5	26.69	20,007	.....
1914	23.7	26.00	109,153	.....
1915	....	25.47	247,781	.....
1916	....	29.03	84,435	.....

The car supply and mileage statistics for the month of September of these years show a similar correlation:

September.	Average Car Mileage Per Day. For A. R. A. Roads.	Average Car Mileage Per Day. For 46 Lines.	Average Daily Car Surplus or Shortage. For A. R. A. Roads.	For 46 Lines.
1907	24.00	.....	†28,855	.....
1908	22.00	.....	‡172,515	.....
1909	24.30	.....	‡72,285	.....
1910	24.20	.....	‡35,802	.....
1911	23.80	.....	‡57,160	.....
1912	24.40	.....	†13,207	.....
1913	24.30	26.96	‡49,233	‡29,004
1914	.....	26.50	‡149,688	‡87,663
1915	.....	27.86	‡131,675	‡71,728
1916	.....	31.54	†40,285	†22,547

* Car supply figures available only for last half of fiscal year ending June 30, 1907.
† Shortage.
‡ Surplus.

The average daily car mileage for September, 1916, for the roads reporting was 31.54, an increase of 3.68 miles over 1915, and the prospects are that the car movement record for the fiscal year 1917 will break all records and be three or four miles in excess of the average for 1916. Of course, one explanation for this increase is the car shortage that has prevailed during the fall and winter, and because of which all available cars have been kept in active service. But this is not the whole explanation, as evidenced by the comparison, previously made, between the fiscal years ending June 30, 1913, and June 30, 1916. Furthermore, the average car



Car Supply and Car Mileage for September 1907 to 1916, Inclusive

mileage of a number of eastern railways has actually decreased on account of congestion at the ports, a condition brought about by the reduction of imports and the great increase in export business. The New York, New Haven & Hartford averaged but 13.1 miles per car per day in the fiscal year 1916, as compared with 15.3 miles in 1915, 16.3 miles in 1914 and 16.7 miles in 1913. Other eastern roads, as for example, the Central Railroad of New Jersey, also show a smaller car mileage for 1916 than for previous years. This is principally because the demurrage rules allow cars at the ports to be held for long periods under load, and because, owing to the shortage of ships, there has been an enormous accumulation of cars in the yards of the roads terminating at the ports.

The accompanying tables give detailed statistics for the 46 roads covered by this article.

It is often unfair to make direct comparisons of the car mileage of one road with that of another, as no two roads handle exactly the same kind of freight, or have like amounts of local and through business. A road with a relatively small amount of business on branch lines is likely, other things equal, to make a very large average mileage per car per day. For example, the Western Pacific, with practically no branch lines, no large terminals and a large volume of long haul business, has a car mileage record of 72 and 74 in September and October, 1916, respectively, and the high average of 80 miles for October, 1915. The Union Pacific also has a large amount of long haul traffic, with a relatively small percentage of cars in terminals and on branches. In September, 1916, its average car mileage per day was 73.5, as compared with

CAR MILES PER DAY AND SHORTAGE OR SURPLUS OF CARS IN SEPTEMBER

	Car Mileage per Day 1913	1914	1915	1916	Surplus or Shortage (–) of Cars 1913	1914	1915	1916
Southern Railroads								
Illinois Central	30.43	28.94	32.05	37.43	–314	3,253	2,582	–1,532
Seaboard Air Line..	22.48	18.66	22.27	22.84	1,080	2,336	2,108	616
Southern	24.31	22.64	23.01	28.88	–1,257	3,950	2,047	–3,298
N. C. & St. L.....	28.16	22.96	25.97	29.62	.....	.....	–160	–343
St. Louis So. W....	24.98	21.32	21.59	30.04	228	994	432	–620
Mobile & Ohio.....	28.10	28.70	27.30	36.54	–322	647	52	–925
Atl. Coast Line.....	24.08	22.68	24.35	27.54	419	1,712	2,954	506
Cent. of Ga.....	23.70	18.81	22.51	26.20	–270	272	225	–150
Norfolk Southern...	12.40	20.80	24.80	28.20	–47	61	10	–7
Kansas City Sou....	27.20	31.20	34.80	38.20	–4	111	–52	–317
Western Railroads								
O. W. R. & N...	28.10	21.70	21.30	36.70	611	1,882	1,620	467
C. R. I. & P.....	19.70	23.60	27.10	29.20	4,243	7,400	4,902	1,898
A. T. & S. Fe.....	33.28	34.48	30.45	37.40	9,911	13,644	14,741	3,971
M. K. & T.....	22.21	20.05	20.73	25.94	.....	.....	–111	–991
C. B. & Q.....	33.30	32.00	31.10	36.50	1,618	4,658	8,755	–1,877
C. M. & St. P.....	27.40	29.93	31.30	34.73	–2,159	792	3,806	–3,478
M. St. P. & S. S. M.	26.54	26.84	28.17	28.56	5,565	6,232	7,920	2,002
C. G. W.....	23.00	27.80	27.80	29.40	–50	822	905	–116
Union Pacific	61.20	51.10	51.10	73 50	727	2,869	917	–896
Wabash	27.10	28.00	32.00	38.20	–200	375	695	–1,700
Western Pacific	69.00	79.00	63.00	72.00	.....	.....	.....	–25
Texas & Pacific....	23.20	24.60	24.00	26.30	1,173	1,944	477	112
Southern Pacific ...	40.40	36.40	41.00	48.80	2,208	1,928	1,277	1,310
Great Northern	24.90	27.80	30.10	33.20	.....	5,000	–2,500	.....
Northern Pacific ...	.....	.....	.....	.....	.....	.....	.....	.....
Sou. P. T. & L. Lines	24.90	22.50	22.40	32.2	285	3,824	2,612	–517
D. & R. G.....	24.01	22.32	23.43	29.06	.....	.....	.....	.....
C. & N. W.....	22.75	25.00	27.11	26.50	–100	2,250	3,125	–130
Mo. Pac.	26.63	28.46	27.17	29.91	403	720	521	–777
St. L.-S. F.....	23.08	22.51	24.01	26.07	5,147	5,090	4,512	1,424
Eastern Lines								
Toledo St. L & W..	29.84	26.72	30.89	33.46	40	317	93	–65
C. & A.....	24.43	26.65	29.83	33.09	47	2,038	1,294	497
C. & E. I.....	14.66	14.33	17.35	17.81	–14	371	–288	–1,213
N. Y. C. & St. L..	35.30	31.20	35.20	.....	140	524	378	–629
Dela. & Hudson....	24.70	25.30	23.20	23.00	.....	.....	132	.....
West. Maryland ...	17.21	18.29	23.83	23.65	.....	.....	–25	–50
Phila. & Reading...	22.03	20.62	22.44	19.68	514	2,000	992	–434
Penna. R. R.....	28.17	23.41	26.09	24.19	–558	5,033	620	–4,893
Central of N. J....	16.47	16,74	15.54	15.72	–14	790	2,111	218
N. Y. N. H. & H..	15.90	14.80	14.90	14.20	–388	435	–340	–232
B. & O.....	23.80	25.00	27.30	26.50	–319	–39	–325	–1,626
Boston & Maine....	18.40	18.20	19.30	18.90	.....	.....	.....	.....
W. & L. E.....	17.70	17.40	19.70	19.50	.....	.....	.....	.....
Norfolk & Western..	39.80	34.85	36.74	45.80	1,400	1,600	750	–3,700
D. L. & W.....	28.30	28.60	32.80	30.10	.....	.....	.....	.....
Ches. & Ohio.....	26.78	28.46	33.41	34.69	–1,259	–1,093	23	107
L. & N.....	29.99	27.47	30.98	39.50	520	2,921	1,941	–2,514
Total	.....	.....	.....	.....	29,004	87,663	71,728	–22,547
Average	26.96	26.50	27.86	31.54	.....	.....	.....	.....

51.1 in the same month in 1915. The greatest mileage per car per day for this line was achieved in August, 1916, when the average was 77.5. The average movement of Pacific Fruit Express cars in September, 1916, was 140.3 miles per day, and in August, 1916, 175 miles.

It often happens that the average car mileage varies considerably on different parts of the same railroad. This point is amplified in a letter from J. M. Davis, vice-president of the Baltimore & Ohio, which is, in part, as follows:

"Lines having a large proportion of through traffic will always show a higher mileage than those with a large percentage of local traffic. This is illustrated by the Maryland district (B. & O.) which for the past two weeks has averaged nearly 41 miles per day due to the large amount of traffic handled through over the Cumberland and Philadelphia divisions. On the Pennsylvania district where nearly one-third of the total cars on the line are located, a large percentage of the cars now being handled is local and short haul traffic. Some of the western lines (B. & O.) show very high mileage because a large proportion of their traffic is through, long haul business."

Car mileage is sometimes low because a road crosses the main currents of business. This is true of the Chicago & Eastern Illinois, a north and south line, crossed every few miles by one or more connecting roads, from which cars are received and to which cars are delivered. The average car mileage per day on the C. & E. I. was 18.73 in October, 1916, and 17.81 in September.

It was pointed out in a number of letters received in connection with the collection of these statistics that high mileage is secured not by the speeding up of trains on the road, but through prompter handling of cars in terminals and less detention for loading and unloading. What a large proportion of car time is spent in loading and unloading and at terminal and interchanging points was ably shown by C. F. Balch, statistician of the Chicago & North Western, in an article in the *Railway Age Gazette* of December 22, 1916.

Many letters received from railroads in the course of this investigation contained statements of the intensive efforts made to reduce car detention. On some lines division operating officials make station to station canvasses, instructing agents and other employees concerning the prompt handling of equipment, interviewing shippers and receivers of freight and soliciting their co-operation. In some instances special agents from the general offices have been assigned to different territories to the same end. Members of the traffic department also have been generally instructed to induce shippers and consignees to load and unload more promptly.

That the railroads also recognize the importance of loading and unloading company freight expeditiously is evidenced by a letter from B. F. Bush, receiver of the Missouri Pacific, which states that his road has reduced detention of equipment loaded with company material to a minimum by the purchase of additional traveling cranes. He also stated that, as the result of heavy expenditures in the previous 18 months for the repair of freight car equipment, the number of bad order cars on the line had been reduced to 3 per cent.

A few railways in unfortunate financial condition show a considerably lower car mileage for system cars than for foreign cars. This is due, in part, to the fact that limited appropriations for repairs and the increased cost of labor and materials have prevented a reduction in the number of bad order cars.

An important factor in facilitating car movement is locomotive power. In commenting on the increase in car mileage on his road, S. M. Felton, president of the Chicago Great Western, says: "Our biggest single action (toward improving car mileage) has been the securing in advance of ample power to enable us to move all our traffic promptly and avoid congestions everywhere." The average car mileage per day of the Great Western was 29.6 in the fiscal year 1916, as compared with 25.1 in 1913. The average for October, 1916, was 31.8 miles and in the same month of 1913, only 23 miles, or an increase in four years of over 38 per cent.

A complaint voiced in a number of letters received is that the holding of cars of grain, coal and lumber at terminals for speculative purposes is a cause of excessive detention. United efforts are being made by the railways to eliminate this abuse by securing an advance in reconsignment charges for both interstate and intrastate traffic.

A few of our correspondents stated that they were loading trains lighter to facilitate car movement. A considerable number stated that they made a practice of embargoing consignees with an accumulation of cars in excess of their ability to unload promptly. In this connection it was pointed out that the lack of sufficient sidetracks and adequate facilities for loading and unloading on the part of the shippers and consignees contributed largely to low car mileage. In October, 1916, over 25 per cent of the cars on the Southern Pacific, Texas and Louisiana lines, were held at stations awaiting unloading.

The practice of storing empty cars on industry tracks for prospective business has been largely eliminated with a favorable effect on average car mileage.

How closely railroads supervise car movement is well brought out in the following excerpt from a letter from W. G. Bierd, president of the Chicago & Alton:

"Car mileage is a matter of constant supervision not only in the office of the superintendent of car service, but by the local forces in the division superintendents' offices. The 'on hand' reports are checked daily and agents are required to get after individual shippers who are slow in releasing cars; consignees are frequently importuned to assist by releasing cars within the free time period; demurrage tariffs are strictly enforced. Local conductors are requested to assist in unloading freight from cars rather than set out merchandise cars at stations. The movement of empty cars through yards is checked by requiring yard forces to show on 'empty' slip bills the date cars move in and out of the yards. Agents are required to ask for disposition on cars at the time they move into the station under load instead of waiting until the car is empty. At our larger terminals, where it can be done, requests for home routes and disposition on empty equipment are handled by telephone.

"The handling of company material is checked each week and attention called by individual numbers to cases where cars are being delayed under load with company freight, the proper party being asked to release the car without delay. At the principal merchandise handling stations, cars are coopered and made fit for grain and other such commodities while they are being unloaded, in order to have the cars in shape to switch out and set for other loading as soon as released from merchandise service. Repair tracks are checked frequently to see that there is no delay in making repairs to foreign equipment or that light repair cars are not detained behind heavy repair cars. The movement of cars is watched by a frequent check of car records, and car record clerks are required to call attention to cars detained at stations or in yards."

CAR MILEAGE PER DAY FOR OCTOBER AND THE FISCAL YEAR

	October				Fiscal Year			
Southern Railroads	1913	1914	1915	1916	1913	1914	1915	1916
Atl. Coast Line	25.25	26.07	24.47	29.74	24.36	25.08	24.99	27.49
Cent. of Ga.	24.23	19.19	22.31	24.04	21.36	21.45	19.53	22.96
St. L. S. W.	23.11	22.22	23.94	.....	28.22	25.54	19.78	24.83
Illinois Central	30.45	30.41	33.25	38.02	27.74	29.18	27.53	34.64
Kansas City Sou.	27.80	31.00	35.70	38.40	26.90	29.50	30.50	36.00
L. & N.	29.99	27.15	33.07	39.55	27.77	26.52	26.12	32.86
Mobile & Ohio	32.00	27.80	28.24	39.78	33.38	32.18	26.16	31.27
N. C. & St. L.	28.18	24.80	29.82	31.51	29.91	27.02	24.71	30.36
Norfolk Southern	16.70	21 80	27.10	29.70	18.10	14.50	20.50	25.40
Sea. Air Line.	23.80	20.49	21.31	23.87	22.92	23.15	21.63	23.03
Southern	25.75	25.35	24.95	30.32	25.35	25.23	22.49	26.10
Western Railroads								
A. T. & S. F.	36.52	35.51	35.46	36.74	31.58	32.91	32.44	34.31
C. & N. W.	24.88	25.85	29.00	27.21	23.03	23.19	23.14	26.83
C. B. & Q.	35.20	32.00	35.00	39.40	31.70	29.10	28.00	31.50
C. G. W.	23.00	28.80	31.20	31.80	25.10	24.80	27.20	29.60
C. M. & St. P.	28.06	29.10	32.39	35.18	25.96	26.02	29.10	33.25
C. R. I. & P.	20.80	24.20	27.80	31.10	26.20	24.60	24.90	28.80
D. & R. G.	25.35	22.98	26.88	30.72	23.30	21.11	18.95	23.15
Great Northern	30.00	25.80	30.60	.....	24.00	18.10	18.60	24.30
M. St. P. & S. S. M.	27.74	27.42	32.58	30.86	26.61	24.14	23.35	26.99
M. K. & T.	22.03	22.75	22.91	26.20	23.54	20.37	20.98	24.21
Mo. Pacific	26.85	28.58	30.40	30.60	24.98	26.14	27.69	28.58
No. Pacific	.....	.....	26.40	32.60	.....	.....	.....	.....
O. W. R. R. & N. Co.	30.00	24 20	26.00	43.80	25.30	26.90	22.00	26.40
St. L.-S. F.	24.55	24.27	25.94	25.36	25.31	23.35	22.55	25.28
Sou. Pacific	43.60	36.20	45.80	49.00	37.70	36.70	31.90	40.50
Sou. P. T. & L. Lines	23.60	23.20	25.60	29.70	20.40	21.90	21.80	26.80
Tex. & Pacific	24.40	25.30	24.80	25.20	24.80	24.80	25.00	26.50
Union Pacific	59.30	46.80	59.80	.....	44.50	46.50	38.30	54.80
Wabash	27.60	28.80	33.30	37.50	25.96	26.25	31.16	33.45
West. Pacific	75.00	76.00	80.00	74.00	67.00	68.00	68.00	68.00
Eastern Railroads								
B. & O.	24.70	24.30	28.30	27.50	26.20	24.30	23.70	27.80
B. & M.	19.50	19.00	20.20	.....	17.20	18.30	18.60	18.30
Cent. of N. J.	18.93	16.97	17.36	15.85	19.56	17.20	15.45	14.49
C. & A.	22.45	26.62	32.85	32.03	21.53	21.14	22.64	27.89
C. & E. I.	16.19	13.63	18.96	18.73	14.68	14.54	13.54	17.98
C. & O.	26.51	29.74	31.69	.....	24.64	26.73	29.54	33.91
*D. & H.	26.00	25.50	25.70	22.40	24.20	23.70	24.90	22.80
D. L. & W.	29.80	30.80	34.90	.....	24.90	25.70	28.10	29.00
N. Y. C. & St. L.	36.80	34.30	36.40	.....	37.60	36.00	32.60	37.80
N. Y. N. H. & H.	15.50	16.10	15.20	.....	16.70	16.30	15.30	13.10
N. & W.	40.80	28.81	39.97	.....	38.32	34.02	28.12	39.16
Pennsylvania	29.09	23.61	27.41	23.58	27.97	25.56	22.96	24.46
P. & R.	24.45	20.65	22.99	.....	22.03	20.30	19.60	20.09
T. St. L. & W.	31.37	28.17	33.14	.....	33.23	34.52	38.38	33.20
West. Maryland	18.99	19.10	29.11	23.02	17.79	18.22	20.36	26.66
W. & L. E.	17.40	18.60	18.00	.....	18.10	15.40	18.60	20.80
Average	28.13	27.13	30.17	32.17	26.69	26.00	25.47	29.03

*Fiscal year ends December 31. Figure for 1916 first 10 months.

NEW LINE IN INDIA.—A survey is to be made by the Eastern Bengal Railway for a railway of 5 ft. 6 in. gage between Khulna and Dum Dum, a distance of about 80 miles.

A BOILER METAL TREATMENT

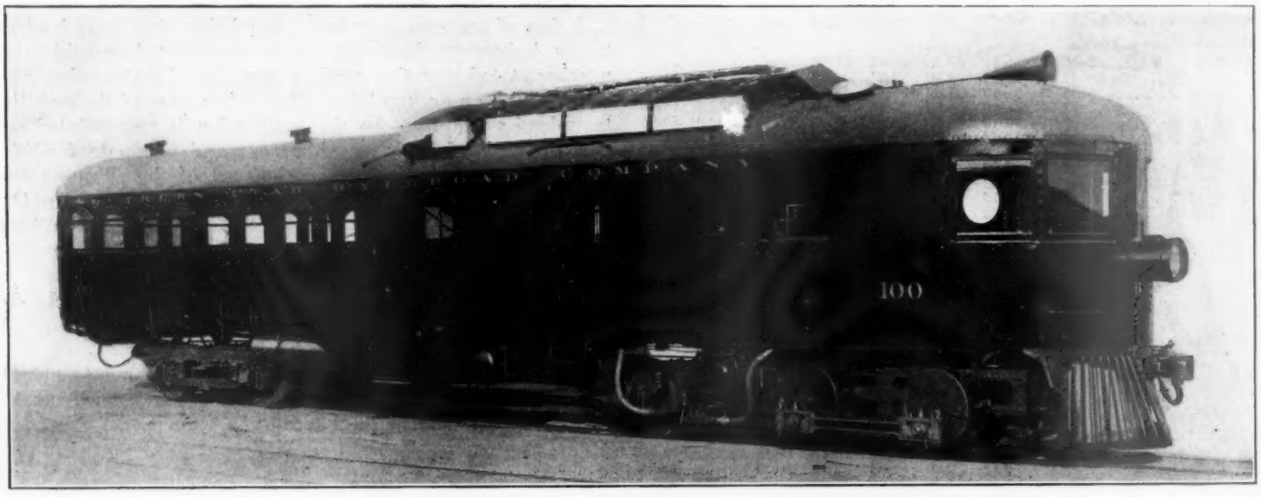
A boiler metal treatment called Perolin has been introduced into the railway field recently by the Perolin Railway Service Company, St. Louis, Mo. This product has been used in stationary practice for the past seven years, and over 40,000 boiler plants are now using it. It is being used in locomotive service by several roads, and has been found to give satisfactory service. Perolin treats the boiler metal and is not a boiler compound, or a chemical water treatment. It is a viscous, non-volatile, mineral liquid which has an affinity for hot metal and a high coefficient of expansion. When injected into the boiler through a short pipe or syphon attached to the suction side of the injector it diffuses through the water, and being attracted to the hot boiler metal, is drawn through the pores, cracks and crevices of the scale into direct contact with the metal. As its temperature is raised it expands, reaching its maximum expansion at 500 deg. The expansion force exerted between the scale and the metal removes the scale mechanically. During and after the removal of the scale a thin heat conducting film of Perolin is established on the metal, which prevents sediment from baking on in the form of scale, and at the same time it protects the metal against pitting and corrosion. Through its "colloidal action" Perolin will prevent boiler foaming and it has been found that it will give satisfactory results irrespective of the kind of water used.

In locomotive service Perolin is fed to the engine through the injector at the roundhouse by the hostler when he is preparing the engine for service. None is required to be fed to the engine by the engineer or fireman while on the road. Where this treatment has been used in locomotive service it has been found that engine failures due to poor water have been reduced, that the mileage between boiler washings has been increased three to four times, that less tube and tube sheet work are required, with a consequent saving in firebox repairs and that the life of the tubes and tube sheets and stay bolts has been increased by its use. With cleaner boilers the fuel consumption will be decreased, and this is one of the results that has been realized by its use. Where Perolin has been used it has been found unnecessary to erect and operate water treating plants which require attention with every change in the analysis of the water throughout the year. The company provides special representatives for the service of the railroads using Perolin to see that it is being properly applied to the locomotives and that the roads are obtaining the fullest possible benefit from its use.

MOTOR CAR FOR MOUNTAIN SERVICE

The McKeen Motor Car Company, Omaha, Neb., has recently delivered to the Southern Utah one of the most powerful motor cars ever built. It is equipped with the builders' standard type 300 hp. motor unit mounted on a six-wheel driving truck, of which the two forward axles do the driving and the rear axle acts as a trailer. The forward axle is connected to the main axle by rods, as indicated in the illustration. This motor car is to replace steam passenger train service between Price, Utah, and Hiawatha, a distance of about 18 miles. There are grades as high as 4.92 per cent on this line and a few miles of 2.5 and 3 per cent. The car is provided with three speeds, the intermediate speed having sufficient power to operate the car on the heaviest grade, the lowest speed being used at starting and when hauling a trailer. The driving wheels are 42 in. in diameter, and are provided with the standard steam locomotive design of equalizers. The trailing wheels are equipped with a special transfer equalizer.

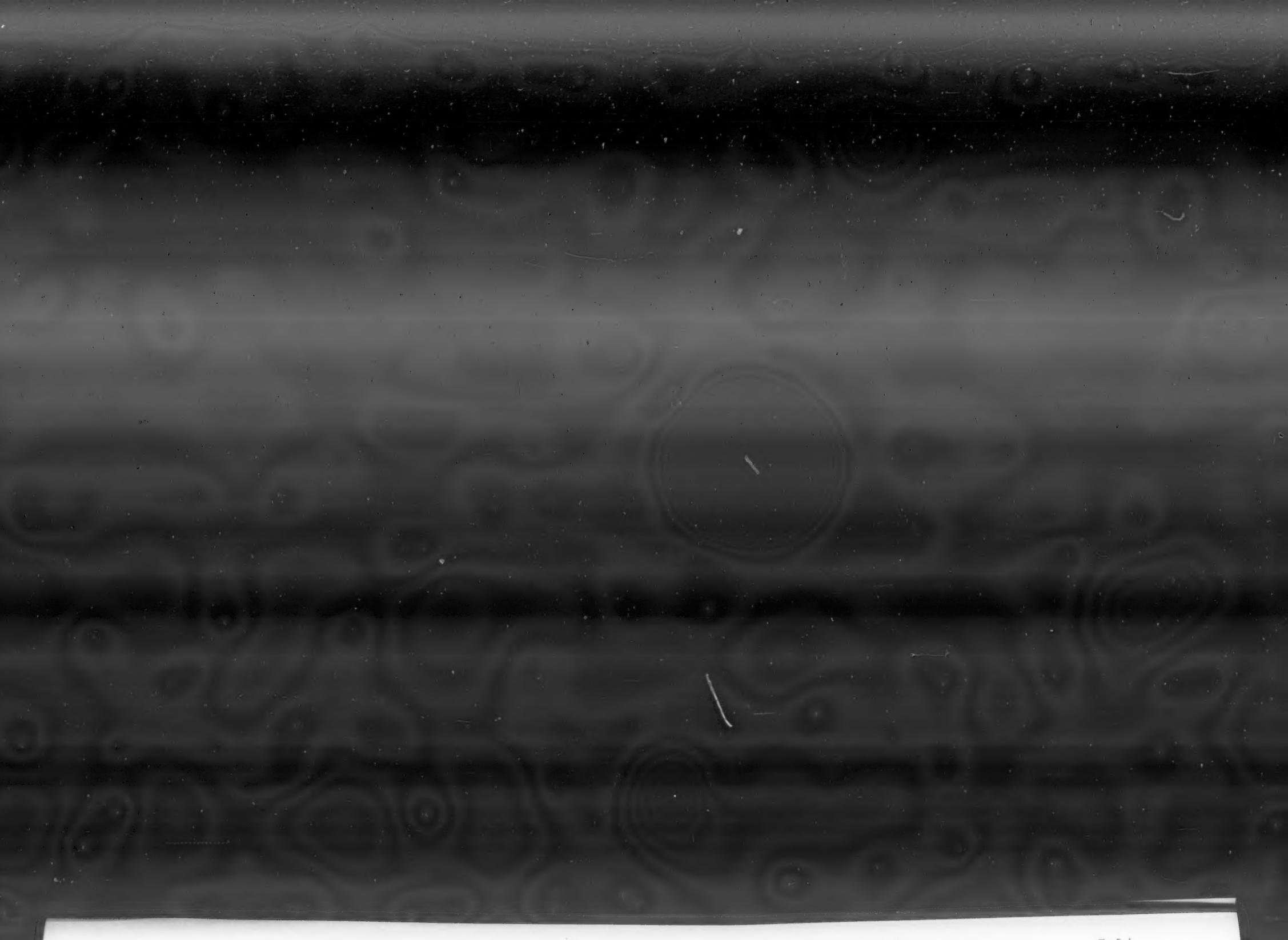
The engine is designed for using fuels of low specific gravity, having a specially developed arrangement which eliminates the intake or vapor pipes. The fuel is atomized automatically for all engine speeds. This enables the engine to be operated on a distillate of a reasonable gravity, interchangeable with gasoline. By starting with gasoline or another high grade of distillate, kerosene can be used as the fuel. The car is provided with a multiple braking equipment. There are two hand brake equipments, one operating independently of the power brake, and the other in harmony with the power brake. Special safety stops are provided on both the power brake and independent hand brake systems, and in case of a rod failure on one truck the system can be operated on the opposite truck, and the other brake can be applied to both trucks. The car has the following general dimensions:



McKeen Motor Car of 300 h. p. for the Southern Utah

Driving wheels, diameter	42 in.
Driving wheel base	4 ft. 8 in.
Motor truck wheel base	12 ft. 10 in.
Total wheel base	41 ft. 8¾ in.
Length over all	58 ft. 2¾ in.
Width over side sills	9 ft. 8 in.
Height, rail to roof	11 ft. 9 3/16 in.
Weight	91,000 lb.
Seating capacity	48
Baggage room, length	10 ft. 3 in.

A HEAVY COAL BILL.—The coal and coke consumed on the Midland Railway amounts annually to 1,912,471 tons, the cost of which works out at £2 15s. 5d. ($13.40) per minute.—*Railway Gazette, London.*



Convention of Wood Preservers' Association

A Resume of the Reports and Discussions at the Thirteenth Annual Meeting Held This Week in New York

THE thirteenth annual meeting of the American Wood Preservers' Association was held at the Hotel Astor, New York on Tuesday, Wednesday and Thursday of this week. Approximately 125 members were present.

The officers of this association during the past year were president, Carl G. Crawford, general manager, American Creosoting Co., Louisville, Ky.; first vice-president John Foley, forester, Pennsylvania Railroad, Philadelphia, Pa.; second vice-president, M. K. Trumbull, vice-president, National Lumber and Creosoting Co., Kansas City, Mo.; secretary-treasurer, F. J. Angier, superintendent of timber preservation, Baltimore & Ohio, Baltimore, Md.

The convention was called to order by President Crawford at 10 o'clock Tuesday morning. In his opening address Mr. Crawford reviewed briefly the history of the organization since its inception at an informal gathering of a few timber-treating men at Perth Amboy, N. J., in 1904, and its first convention in New Orleans in January, 1905. He placed special emphasis on the necessity of laying aside a spirit of commercialism in the work of this association and subordinating individual interests to those of timber preservation as an industry. He also urged the continued cooperation of those men in railway service. In concluding he called attention to the recent action of several national engineering associations interested in wood preservation in which they voted to accept as their standards the recommendations and conclusions of the American Wood Preservers' Association.

The report of the secretary-treasurer showed a net gain in membership during the year of 24 and a total membership of 300, 79 of whom are connected with 37 different railroads. A balance of $476 was reported in the treasury.

TERMINOLOGY

The committee on terminology, whose report was adopted, presented descriptions of the more commonly-used processes for the treatment of timber as follows:

Pressure Processes

The Allardyce process is not patented, and is used chiefly for ties. It consists essentially of the following steps:

(a) A solution of zinc chloride is forced into the wood at a maximum pressure of 75 to 100 lb. per sq. in. until the desired absorption is obtained (commonly ¼ to ½ lb. of dry salt per cubic foot). (b) The zinc chloride is then drained from the retort, and creosote admitted and injected into the wood at a pressure of about 100 to 150 lb. per sq. in. until the desired absorption (usually 3 to 4 lb. per cu. ft.) is obtained. The pressures used under a and b depend upon the character and condition of the wood under treatment. The pressure under b however must be higher than that under a.

The Bethell—(Full Cell) process was patented by John Bethell in England in 1838, and is commonly used for the creosoting of piles, poles, cross-arms, paving blocks, structural timber, lumber, and ties. As now practiced it consists essentially of the following steps: (a) A preliminary vacuum is maintained for ½ to 1 or more hours. (b) The oil is injected under pressure, the maximum usually being between 100 and 180 lb. per sq. in., but sometimes as low as 25 lb. (c) Final vacuum (sometimes omitted). Green timber is usually subjected to a live steam bath at about 20 lb. pressure for several hours before the preliminary vacuum. Seasoned timber is not usually steamed, except in the case of paving blocks. The amount of oil injected depends upon the specifications of the purchaser, but the absorption per cubic foot is usually within the following ranges: lumber, poles, structural timbers, cross-arms, ties, fresh water and land piles, 6 to 12 lb.; paving blocks, 12 to 20 lb.; salt water piles, 16 to 24 lb.

The boiling process was patented by Wm. G. Curtis and John D. Isaacs in 1895, and reissued the same year. It is used chiefly for creosoting Douglas fir piles, timber, lumber, ties and paving blocks. It consists essentially of the following steps: (a) Wood (either green or seasoned) in the treating cylinder is covered with oil at about 160 deg. to 190 deg. F. (b) The oil is heated above 212 deg. F. at atmospheric pressure and vapors passed through a condenser. (c) The heating is continued until the rate of condensation falls to 1/6 to 1/10 lb. of water per cu. ft. of wood per hour. This sometimes requires 40 to 60 hr. or more for green timber, but may be as low as 10 hr. for dry timber. (d) The treating cylinder is partially emptied and refilled with cooler oil to lower the oil temperature before starting pressure. (e) Pressure is applied to a maximum of 120 to 180 lb. per sq. in. until the desired absorption is obtained; usually 10 to 16 lb. per cu ft.

The Boulton—(Boiling Under Vacuum) process was patented by S. B. Boulton in England and the United States. It is used chiefly for the treatment of Douglas fir piles, timber, ties, lumber and paving blocks. As now practiced it consists essentially of the following steps: (a) The timber is immersed in hot creosote and subjected to a vacuum, and the escaping vapors are drawn through a condenser. (b) The temperature (usually 190 deg. to 215 deg. F.) and the vacuum are maintained until the rate of condensation of water falls to a specified amount per cubic foot of wood per hr.—usually 1/6 to 1/10 lb. (c) The vacuum is discontinued and the pressure applied until the desired absorption is obtained. This is commonly 12 to 16 lb. per cu. ft. for paving blocks, 12 to 14 lb. for piles, 8 to 12 lb. for lumber and timber, and 5 to 8 lb.. for ties.

The Burnett process was patented in 1838 in England by William Burnett, and is in general use for treating ties, lumber, and timber with zinc chloride. As now practiced it consists essentially as follows for seasoned wood: (a) Preliminary vacuum. (b) The zinc chloride solution is applied under a pressure of 100 to 175 lb. per sq. in., to approximate refusal. For green timber, a steaming period of 1 to 5 or more hours at about 20 lb. is usually applied before the vacuum. The strength of the zinc chloride solution is generally so regulated that at refusal the timber will have absorbed from ¼ to ½ lb., usually the latter, of dry zinc chloride per cubic foot.

The Card process was patented by J. B. Card in 1906, and is used chiefly for ties, lumber and timber. The essential parts of the process are: (a) The use of a mixture containing about 80 per cent of zinc chloride solution and 20 per cent of oil. (b) The method of keeping the zinc chloride and oil mixed during treatment by means of a rotary pump, which draws the mixture from the top of the treating cylinder and returns it at the bottom through a perforated pipe. The use of steaming, vacuum, and pressure are the same as in the Bethell process. It is customary to inject about ½ lb. of dry zinc chloride and 2 to 3 lb. of oil per cu. ft. of timber.

The Lowry—(Empty-Cell) process was patented by C. B. Lowry in 1906, and is used chiefly for treating air-seasoned cross-ties but also for poles, posts, paving blocks and silo

staves. It consists essentially of the following steps: (a) Without first drawing a vacuum, oil at not to exceed 200 deg. F. is injected into the wood to refusal, or to a specified amount. (b) A quick vacuum is drawn to remove the excess oil from the timber. The air imprisoned by injecting the oil without a preliminary vacuum expands during the final vacuum, forcing out a certain amount of oil with it. It is customary to leave in ties a net of about 2½ gal. of creosote per tie (6 to 8 lb. per cu. ft.), and 6 to 10 lb. per cu. ft. in other timber.

The Rueping—(Empty-Cell) process was patented in the United States in 1902 and 1911 by Max Rueping and is used chiefly for ties and lumber. As commonly used, the process consists of the following: (a) The treating cylinder, containing the wood, is filled with compressed air and so held for an hour or more. (b) The treating cylinder is filled with oil, allowing the air to escape, but without reducing the pressure. (c) When the treating cylinder is full of oil, the pressure is increased to a maximum of 150 to 200 lb. per sq. in. and held to refusal, or until the specified absorption is obtained. (d) The oil is drained and a vacuum is drawn to remove the excess oil from the wood. The air imprisoned during (a) expands during (d), forcing out a certain amount of oil with it, and the process is, therefore, called an "empty-cell" process. If desired (a) may be omitted, and the air pressure applied after (c). If green timber is treated, it is first artificially seasoned by steaming, boiling, or boiling under vacuum before the pressure is applied. The net absorption is usually 4 to 6 lb. per cu. ft.

The Steaming—(Column) process is not patented and is used almost exclusively for the treatment of Douglas fir piles. It consists essentially of the following steps: (a) The timber is steamed at a pressure of 50 to 100 lb. per sq. in. for 3 to 8 hr., the time and pressure varying according to the dimension and previous degree of seasoning. (b) The steam is released and a vacuum is drawn until the timber is considered seasoned. This usually requires from 7 to 14 hr. The temperature within the treating cylinder during the vacuum period is usually maintained between 180 deg. and 212 deg. F. (c) The oil is injected at a pressure of 80 to 140 lb. per sq. in. until the desired absorption is obtained.

The Wellhouse process was patented in 1879 by Wm. Wellhouse and Erwin Hagen and is used chiefly for ties. It consists essentially of the following steps: (a) A solution consisting of 1½ per cent to 3 per cent of zinc chloride and ½ per cent of glue is injected into the wood at a pressure of about 125 lb. per sq. in. for 3 to 6 hr. (b) The pressure is released, the cylinder drained and a ½ per cent solution of tannin is injected at a pressure of about 125 lb. per sq. in. for about 2 hr. The object of the glue, followed by the tannin, is to form a leathery precipitate to plug the pores in the wood and retard the leaching of the zinc chloride.

Non-Pressure Processes

The Brush Treatment is used frequently on poles, posts and other timbers where it is not desired to use a more effective treatment. It consists in applying the hot preservative to the dry timber by means of a brush. Two coats, 24 hr. apart, are customarily used.

The Open-Tank treatment can be accomplished in two general ways: (A) Dipping, which consists in submerging the wood in hot preservative for 5 to 15 min. (B) Hot and Cold Bath, which is more effective than A. It consists essentially of the following steps: (a) The wood is heated in oil at 200 deg. to 225 deg. F., for one or more hr. (b) It is then either quickly transferred to a tank of cool oil and allowed to stand several hours, or the heating is discontinued after (a) and the wood and oil are allowed to cool together. These methods are frequently used for posts, poles, and other timbers, when it is not desired to use a more effective treatment.

The Kyan—(Kyanizing) process was patented in England by John H. Kyan in 1832. It is used for ties and construction timber and consists of soaking seasoned wood in a solution of mercuric chloride (usually 1 per cent) in an open vat of wood or concrete. It is customary to allow the wood to soak one day more than one day for each in. in thickness. The original Kyan patent specified a solution of 1 lb. of corrosive sublimate to 5 gal. of water (about 2.4 per cent), and the wood was soaked from 14 to 21 days. Other preservatives, such as zinc chloride or sodium fluoride in water solutions, may be used in the same manner, except that the solutions should be stronger. The term Kyan process or Kyanizing, however, is limited to the use of mercuric chloride. When other preservatives are used the process is called "steeping" or "soaking."

Committee:—J. B. Card, chairman (Central Creosoting Co.); E. T. Howson (*Railway Age Gazette*); Geo. M. Hunt (Forest Products Laboratory); G. B. Shipley (Pittsburgh Wood Preserving Co.); M. K. Trumbull (National Lumber & Creosoting Co.).

THE GROUPING OF TIES FOR TREATMENT

By Carlisle P. Winslow.

Assistant Director, Forest Products Laboratory, Madison, Wis.

In its broader aspects, the proper grouping of ties for treatment is dependent upon a variety of variables. Aside from the inherent variations of individual species, we must contend with variations in moisture content, the proportion of heartwood and sapwood, the form of the ties, the character of treatment desired, and the character or kind of preservative used. According to the combination of such variables that may exist at a given plant at a given period or season, will be determined the grouping best suited for its needs. But the underlying and governing factors are the inherent differences in susceptibility to treatment of the individual species.

Any general grouping based entirely on the species is impractical, as the difference in the susceptibility to treatment of the heartwood and sapwood of nearly all species is generally recognized. The innumerable combinations of relative proportions of heart and sap which may exist in individual ties is equally well known. The problem is, therefore, of a dual nature; first, a consideration of the relative ease of treatment of the sapwood and heartwood of different species, and secondly, a classification according to the form of ties it may be desired to group for treatment at a given time and place.

In order to present even the most general grouping of ties for treatment, some classification must be adopted. Innumerable classifications might, of course, be drafted, but the following will serve the purpose:

Class 1. Ties showing no heart on any face.

Class 2. Ties showing no sap on any face.

Class 3. Heart face ties with not less than 80 per cent heartwood.

Class 4. Heart face ties with not over 20 per cent heartwood.

Class 5. Other ties not falling in any of the foregoing classes.

To accompany the foregoing classification, the following grouping is presented as generally indicative of the relative ease of treatment of the different species used for ties. The species in each group are listed alphabetically, and the groups are listed in order of ease of treatment:

Hardwoods

Group 1.—Sapwood. All species listed below are reasonable suspectible to treatment.

Group 2.—Heartwood. Ash, white; ash, green; basswood; beech (white heart); birch; cherry, wild; elm, slippery; elm, white; gum, tupelo; oak, red; oak, chestnut.

Group 3.—Heartwood. Aspen, largetooth; elm, rock;

hickory, mockernut; maple, silver; maple, sugar; sycamore.

Group 4.—Heartwood. Beech, red heart; chestnut; oak, white; oak, burr; gum, red.

Softwoods

Group 1.—Sapwood. All species listed below easy to impregnate with the exception of alpine fir, white fir, white spruce, hemlock (eastern and western). These are considered further in Group 4 below.

Group 2.—Heartwood. Pine, jack; pine, loblolly; pine, longleaf; pine, Norway; pine, shortleaf; pine, spruce; pine, western yellow.

Group 3.—Heartwood.* Pine, lodgepole; fir, Douglas (coast); spruce, Engelmann.

Group 4.—Heartwood. Cedar, cypress; †fir, Alpine; fir, Douglas (mountain); †fir, white; ‡hemlock, eastern and western; larch, western; tamarack; ‡spruce, white.

SPECIFICATIONS FOR THE PURCHASE AND PRESERVATION OF TREATABLE TIMBER

Fundamental Principles

Only perfectly sound timber should be treated. Decay, even when not very noticeable, may greatly reduce the strength value. In order to obtain the best results properly seasoned material should be used. Whenever conditions will permit, thoroughly air season all structural timber, track ties, piles and other materials before treatment. As far as practical arrange delivery of material so that the seasoning period may be during seasons of minimum rainfall and humidity. Pile incoming material in its proper groups or classes, separating green from seasoned or partially seasoned material, and using successive portions of the yard for the storing of green timber. The seasoning yard should be in the open, where the prevailing winds will strike it freely; it should not be in a low and humid situation of any kind if it can be avoided, should have good drainage, and should be kept free from weeds, grass and decaying wood material. All outer bark should be removed before treatment, and in most cases before seasoning. Also as much of the inner bark should be removed as practical, and in no case should over 10 per cent or strips over 1 in. wide and 6 in. long be left. When there is not sufficient time for proper air seasoning, or, in the case of piling and large dimension timbers which will not air season successfully throughout without deterioration, artificial seasoning by steaming or boiling before treatment must be resorted to.

A good preservative is essential to long life. From the standpoint of permanence and protection of wood against decay and marine borers, coal-tar creosote is the best available preservative for general purposes. Zinc chloride deserves full consideration in regions of low precipitation, in dry situations, and where low first cost is essential. While the life of zinc-treated material is usually less than that of creosoted, the expense is also less, and the relation of cost to service is an important consideration.

Proper injection as to quantity and penetration is essential. In treating with creosote, it is recommended that a maximum injection sufficient to insure the penetration of all treatable wood be required. All of the sapwood and as much of the heartwood as is possible for the particular species shall be thoroughly impregnated. This applies equally to full-cell and empty-cell treatments. In treating with zinc chloride it is very essential that all timber be treated to refusal.

Proper subsequent handling of timber is essential. Wherever possible, all timber should be framed before treatment, and in lieu of this, unimpregnated wood exposed by framing after treatment should be thoroughly painted with hot creosote. To secure the best results it is necessary to protect treated material from mechanical abrasion both in handling and under service conditions.

Accurate records as to the life and cost of treated material are essential. It has been the general experience that most satisfactory results are secured by maintenance of a limited number of intensive records of representative sections.

Selection of Treatable Timber

Structural Timber. — The fundamental requirements of structural timbers for treatment are strength and capacity for treatment to an extent which will insure protection against decay on all exposed surfaces. A penetration of ½ in. on the heart faces may be recommended as a safe minimum on structures above ground, although with a few resistant woods as good a treatment as can be expected will show less than ½-in. penetration in the heart. Where strength is required, not only the defects which might reduce the strength, but also the quality as determined by density should be specified; but where strength is not an essential only the soundness of the timber and the sapwood requirements as determining penetrability need be considered.

The specifications governing restrictions on knots, shakes, checks and cross grain, and also on density and the rate of growth of Southern yellow pine, which were adopted by the Southern Pine Association during 1915, should apply to all structural timbers where strength is a prerequisite. Since, for a given species, sapwood of equal moisture content and density is as strong as heartwood, sapwood restrictions need only be considered in relation to the efficiency of treatment. With red oaks, hemlocks and spruces no consideration need be given to sapwood restrictions. With the pines and Douglas fir, however, the amount and distribution of sapwood is of much importance. For other restrictions it is recommended that the specifications of the American Railway Engineering Association, as given on pages 231-234, inclusive, of the 1915 edition of its Manual, be adopted.

Track Ties.—The mechanical properties of timber in relation to the requirements of service conditions and its permeability by the preservative must be considered in selecting species. The sorting of timbers before treatment is progress in the right direction. It is preferable to treat in each cylinder charge one species of timber.

Piles.—The selection and purchase of piles for treatment should take into consideration their ultimate use, whether in salt or fresh water, for land foundation or marine work, and particularly whether subject to marine borers. The sapwood requirements, especially when the heartwood is resistant to treatment, should be based directly on service considerations. The following sapwood restrictions are based on the classification of the character of service for which the pile is to be used:

Specify not less than 2½ in. of sapwood, nor more than 5 in. for piles for use in salt water where the ravages of marine borers are extremely severe. Specify not less than 1 in. of sapwood, nor more than 3 in. for piles for use in salt water where the ravages of marine borers are less severe than in the group above. No sapwood restrictions are necessary for piles for use in fresh water or foundation work on land.

For the present the specifications of the American Railway Engineering Association (1915 Manual, pages 235-236) may be followed as to dimensions and defects of piles.

Preparation of Timber for Treatment

In a moist climate and under humid conditions, season all materials in open piles, which will provide free circulation of air and exposure to the sun. Place a close slanting roof of ties over all piles. By open piles is meant the common

* Some question as to whether the lodgepole pine and Englemann spruce should not be included in Group 2 and the Douglas fir in Group 4.
† Includes sapwood.
‡ No real distinction between heart and sap.

1x7, 1x8, or 7x2 piling system, or other arrangement which gives a minimum contact and the maximum of open spaces between the ties. Insist that the stringers be placed as near the end of the ties as possible, then in case of any defects from contact they will not fall upon the rail bearing. In arid climates with low humidity, season in close piles to prevent checking and warping.

Practically all woods can be air seasoned except in low humid locations. Gum is an exception, unless air seasoned under favorable conditions. Both gum and beech should be seasoned only in wide open piles and watched very carefully for dry rot. Bluing of sap pine during seasoning is not necessarily an indication of decay; it should be watched very closely, however, for the brown blotches, which are indications.

Ties and timbers which have a tendency to check should be protected with "S" irons, or other devices. These should be applied in the seasoning yard to all sticks showing serious initial checks in order to prevent further checking during or after treatment. Red oak and beech should be watched closely in this regard. All ties should be bored and adzed before treatment; this insures a uniform bearing surface and maximum penetration at the rail seat. If possible, all timbers should be framed before treatment; this prevents any exposure of untreated surface where decay would first start.

Oak ties should be given a minimum of eight months' seasoning, and should preferably be seasoned 12 months; yellow pine, if seasoned in the south, 4 to 6 months; hemlock, tamarack and jack pine, 12 months; gum, beech, birch and hard maple, from 4 to 6 months. Winter cut beech is preferable to summer cut, as summer cut checks more readily and the sapwood turns dark in seasoning. Over seasoning may prove detrimental with some species.

All efficient plants should be equipped to steam material which occasion requires. The best method of introducing and distributing steam in the retort or cylinder is by means of perforated pipes. In steaming the pressure should at no time exceed 20 lb. per sq. in., nor the oil temperature in boiling exceed 200 deg. F., with possible exceptions in the case of some Pacific Coast timbers which may require higher temperatures.

Treatment of Timber

The full-cell treatment under the name of the Bethell process has been used extensively for years. It is essentially the impregnation of wood with practically all of the creosote it will hold, thereby giving the maximum protection. For many purposes this treatment is too expensive, and the committee therefore recommends the use of the full-cell process for piles and other marine timbers where subject to attack of the teredo and other marine borers, and that in such situations an injection of at least 20 lb. per cu. ft., or treatment to practical refusal, should be given; while in marine and land situations where decay is the principal source of failure, treatments may range down from 20 to 10 lb. per cu. ft. by the same process, the injection in all cases to be sufficient to penetrate all the sapwood. It further recommends the full-cell treatment in permanent structures not subject to mechanical wear when conditions of moisture, climate or humidity are favorable to wood-destroying fungi, and particularly where the cost of renewals or replacement would be high.

Empty-cell treatment with creosote aims to reduce materially the final retention of creosote per cu. ft., giving at the same time depth of penetration. The committee finds the empty-cell treatment suitable for all pine and other easily treated cross-ties used in moist climates, under service conditions which give a mechanical life in keeping with the anticipated life from decay; also for structures of limited life, or subject to superficial mechanical wear, and elevated so as to be exposed mainly to the wood-destroying influences of weather conditions.

In all outside situations it is recommended that a maximum injection of creosote, or sufficient to insure the penetration of all treatable wood, be required and that not less than an average of 5 lb. of creosote per cu. ft. be left in the treatable portions of the wood; while it is urged as a definitely specified requirement, that at least all of the sapwood and as much of the heartwood as is possible for the particular species shall be thoroughly impregnated, and the depth or extent of the penetration be equal to that of the full-cell treatment.

The committee recommends where zinc chloride alone is used it be by the processes known as Burnettizing, and that a full impregnation which will insure the retention of a minimum of ½ lb. of dry salt per cu. ft. of timber be given. It suggests zinc chloride treatment in arid and semi-arid regions, particularly for cross-ties and other material with mechanical life limited to the expectation of life from decay and checking; also for woods resistant to creosote. It should not be used where mechanical wear is eliminated, nor in situations where the treated timber is in permanent or intermittent contact with either stagnant or flowing water. Consideration should also be given to its use on overhead trestles and similar structures. Under usual conditions three months' seasoning after treatment is advisable.

Creosote-zinc in mixture is fundamentally effective because composed of the two most widely accepted preservatives. In situations where the mixture is preferable to a single preservative, it should be used according to the judgment of the consumer as to its greater economy and efficiency under local conditions.

A. R. Joyce, chairman (Joyce-Watkins Co.); J. B. Card (Central Creosoting Co.); O. P. M. Goss (Consulting Engineer, Seattle); F. R. Martin (C. & E. I.); Geo. E. Rex (A. T. & S. F.); Lowry Smith (N. P.); E. A. Sterling (National Lumber Manufacturers' Association); C. P. Winslow (Forest Products Laboratory).

SERVICE TESTS

A systematic collection, compilation and tabulation of data of this character has been undertaken by the Forest Products Laboratory in co-operation with this committee and the committee on wood preservation of the American Railway Engineering Association. A detailed analysis of the data received was made by R. H. Hicks, engineer in forest products, Forest Products Laboratory, Madison, Wis. The statistics comprise 872 records on 61 species, of which 53 were completed. In compiling these data, letters were sent to all railroad companies known to have service-test records and to many others. The greater part of the accompanying records are from reports of actual test tracks.

Forty completed records were given for 18 untreated species on 5 railroads, 7 for 4 Burnettized species on 3 lines, and 6 for 5 species treated by 3 other methods. Of the latter, beech, red oak, and loblolly pine treated by Long's liquid and placed on the Illinois Central in Mississippi had an average life of 4¼, 4¾ and 5½ years respectively, which indicates this preservative was not a success. The same is true of the red oak ties treated with creosol-calcium, the average life being but 4 years.

The average life of 1,095 southern yellow pine ties treated with zinc-creosote (process not stated) was 15.6 years, while 16 tupelo gum ties treated in the same way lasted but 8.5 years on the G. H. & S. A. Forty-five Burnettized red gum ties placed by this company averaged 6 to 7 years. Two groups of 67 and 68 longleaf pine Burnettized ties averaged 14.8 and 14.4 years, coast Douglas fir 10 to 11 years, and southern sap pine 5.4 and 5.7 years, all of which were treated with zinc chloride and placed in the tracks of the N. Y., N. H. & H., the S. P., and the G. H., & S. A. Rys., respectively.

The Douglas fir was divided where possible into the true coast fir and that grown in the Rocky Mountains. The average life of 100 unseasoned coast fir ties laid with cut spikes without tie-plates was 7.5 years, although the 557 green ties in the track laid with various fastenings gave an average life of 8.3, as compared with 8.4 years for 1,078 seasoned ties in the same location. The average life of 570 green mountain fir ties in another location was 7.6 years, compared with 7.7 years for 571 seasoned ties. A direct comparison of the coast and mountain varieties cannot be made, however, on account of climatic conditions. The coast fir was laid in a much more favorable location, compared with that of the mountain variety.

The following figures submitted by J. H. Waterman of the C., B. & Q., summarize the various treatments by species, and are an average of the conditions on 20 divisions of this railway in the states of Wisconsin, Illinois, Missouri, Iowa, Nebraska, Colorado, South Dakota and Wyoming.

These tires were set in 1909, also 1910, which fact should be kept in mind in analyzing the tables. A general summary, regardless of species, follows:

Process	Total placed	Total removed to Jan., 1917	Per cent removed to Jan., 1917
Straight Creosote	3,264	16	½ per cent
Card	15,817	455	3 per cent
Burnett	2,488	100	4 per cent
Untreated	3,270	2,626	80 per cent

Discussion

A. R. Joyce (Joyce-Watkins Company) described the results of inspections of several installations of treated ties on a western road. A detailed examination of two miles of a 14-mile installation of zinc-treated ties laid in gravel ballast under 75-lb. rail with tie-plates on curves only in western Nebraska in 1900 showed 93 per cent of the ties still in track after 16 years' service. It is estimated that at least 50 per cent of these ties will last 20 years. Adjoining this section 6 miles of untreated fir ties were placed at the same time. These ties began to come out because of decay in 1905 and all had been renewed by 1908. These ties were in a region with 19-in. annual rainfall.

On another line 90 miles long, built by the same road in 1906 zinc-treated fir and pine ties were used with tie-plates on the curves only. The total renewals for all causes on this line during the 10 years since its construction aggregate only 600 ties. The normal life of this class of ties untreated in this vicinity is 6 years.

Other Reports

A detailed report was presented on Preservatives, which contained methods of analysis of and specifications for zinc chloride and creosote and detailed information regarding the methods of conducting tests. The specifications for preservations aroused a large amount of discussion and were finally adopted.

A report on plant operation discussed the methods of measuring the quantities of preservatives used and of determining the volume in a charge of ties, poles or piles, the importance of plant records and means for the control of fuel consumption.

Reports were also presented on Wood Block Paving and on Publicity, Promotion and Education. The latter report emphasized the importance of compiling and making available for general distribution, information concerning treated timber and its advantages.

J. H. Waterman, superintendent of timber preservation, Chicago, Burlington & Quincy, gave a talk entitled, "The Bad and the Good in the Handling of Wood," illustrated by slides and moving pictures. He pointed out defective practices in storing and handling ties which led to their early failure and then illustrated ways to avoid or correct such practices. He concluded his lecture with a moving picture film of the Galesburg, Ill., timber treating plant of the Burlington.

Geo. Rex, manager of treating plants of the Atchison, Topeka & Santa Fe, then presented a number of illustrations of defective methods in using and treating timber and urged that those engaged in this industry pay more attention to this phase of the problem.

Other Business

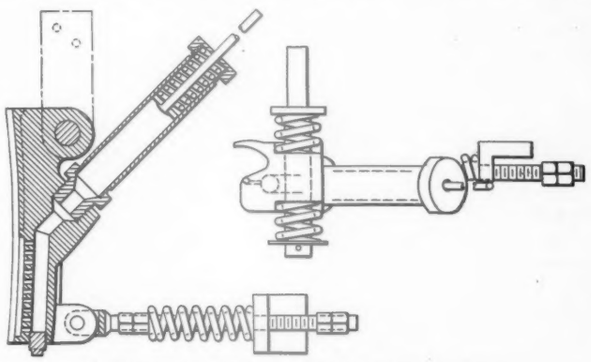
At the closing session on Thursday the following officers were elected for the ensuing year: President, John Foley, forester Pennsylvania Railroad, Philadelphia, Pa.; first vice-president, M. K. Trumbull, vice-president National Lumber and Creosoting Co., Kansas City, Mo.; second vice-president, J. B. Card, president Central Creosoting Co., Chicago, Ill.; secretary-treasurer, F. J. Angier, superintendent of timber treating plants, Baltimore & Ohio, Baltimore, Md.; members of executive committee, V. K. Hendricks, assistant chief engineer, St. Louis-San Francisco, St. Louis, Mo., and C. M. Taylor, superintendent Port Reading Creosoting Works, Port Reading, N. J. It was voted to hold the next annual meeting at Chicago.

The annual dinner was held at the Hotel Astor Wednesday evening.

A FLANGE LUBRICATOR

A flange lubricator, using driving box grease or similar lubricant, has been patented by H. S. Rauch, general foreman of the New York Central shops at Avis, Pa. This device is now applied to a passenger locomotive and it is reported that several other installations will be made in the near future on locomotives in other classes of service.

It will be noted from the drawing that a hanger is provided so that the lubricator may be suspended from a convenient location in line with the driving wheel. Lateral motion is taken care of by means of a loose fitting hanger pin on the lubricator. The lubricator proper is in the form of a shoe which fits against the driving wheel. A number of small holes in the shoe extend to a chamber which holds the grease. A piston with a spring behind it is provided



A Flange Lubricator Using Hard Grease

to force the grease through these holes. In order to have the shoe constantly against the wheel, a second connection is provided, one end of which may be attached to any convenient stationary part of the locomotive. There is a spring and a jam nut on this connection which is adjusted to give pressure between the wheel and the shoe face. A sufficient amount of heat is generated to keep the grease in condition to flow through the small holes and onto the driving wheel flange.

One important feature in the cost of operation of this lubricator is that waste driving box compound can be used as a lubricant. The carbonized portion is removed from the waste driving box grease cakes, and, instead of being thrown out, is saved for use in the flange lubricator.

General News Department

In a fire at Lima, O., on January 19, the main building of the car shops of the Cincinnati, Hamilton & Dayton was destroyed; estimated loss, including 10 passenger cars, $200,000.

The so-called "free bridge," at St. Louis, Mo., which has been under construction for a decade, was formally opened on January 20. The railway over the bridge will not be completed for several months.

H. B. Helm, vice-president of the Louisiana Railway & Navigation Company, has written letters to Senator Underwood and Representative Adamson, urging that when provisions are inserted in regulatory laws to exempt short line roads, the roads expected be those with gross earnings of less than $10,000 a mile instead of those with less than 100 miles of line.

The United States Civil Service Commission announces examinations February 27, in the principal cities of the country, for the position of passenger rate clerk, $100 a month, and freight rate clerk at the same salary, for service in the office of the War Department at Washington and also in the Quartermaster corps of the army at St. Louis. Applicants must be at least 20 years old and must have had three years' experience of the right kind in railway offices.

Canadian Trainmen Called to the Seat of War

The general manager of the Canadian Government Railways has issued a circular calling for men enough to make up 20 train crews, to volunteer for service on the military railroads in France.

St. Paul Union Station

The directors of the St. Paul Union Depot met in Chicago on Wednesday and agreed on the plans for the new headhouse. They had come to an agreement on the track plan some time ago. All of the roads have signed the operating agreement except the Chicago, Milwaukee & St. Paul and the Chicago Great-western, whose action awaits a vote by the directors, and the Rock Island, which will have to have the court's consent.

Pennsylvania Improvements in Baltimore

The Pennsylvania Railroad on Wednesday last submitted to Mayor Preston of Baltimore its extensive and long expected plans for improvements in that city. The plans are in the shape of three ordinances, including new tracks, a new Calvert station, twin tunnels on Hoffman street, with a long, open cut, and a new double-track tunnel on Lauens street, paralleling the Wilson street tunnel.

Beginning at Calvert station, the pivotal point of the plans, the company purposes to build a new station at Calvert and Bath streets, and bring the freight traffic in on practically the same plan as at present; but the passenger tracks are to be put on an elevated structure.

At the Union station yards the eastward improvement begins with a twin tunnel, or tube, paralleling the present Hoffman street or Union tunnel. The tunnels are of the tube type, each one containing but one track. There is to be an open cut from Greenmount avenue to Ensor street. The changes go out as far as Loudon park. Grades will be changed at Frederick road, but not enough to make any serious change in the present situation.

The Webb Bill

The Webb bill, designed to permit co-operative action by manufacturers to promote export trade, may be rewritten in the Senate. A subcommittee of the Committee on Interstate Commerce, which has held public hearings on the bill, is to be appointed for the purpose. A special committee of the United States Chamber of Commerce has filed a report with the committee urging the passage of the bill, but in a different form from that in which it passed the House, which so amended the bill as to prevent the exemptions from the Sherman Act taking effect under certain conditions. According to the committee, the language of this amendment nullifies the whole purpose of the legislation and should be eliminated. Other organizations have made the same point during the hearings.

N. O. T. & M. Protests Against "Tentative Valuation"

J. S. Pyeatt, president of the New Orleans, Texas & Mexico, has filed with the Interstate Commerce Commission a protest against the so-called "tentative valuation" of the property of this road, recently issued by the commission, on the ground that the report does not constitute the tentative valuation required by the valuation act and that the true valuation of the road cannot be determined therefrom, because the Division of Valuation has failed to include in its report many elements of value and has understated others. It is declared that the division of valuation has failed to report either the original cost or the present value of the stocks, bonds and other securities of the St. Louis, Brownsville & Mexico; Beaumont, Sour Lake & Western, and the Orange & Northwestern railroads, which constitute the Texas lines of this carrier's system, and that the tentative valuation covers only the 172 miles of the road in Louisiana, although its total capitalization of approximately $40,000,000 covers the 900 miles of line in Texas owned by these three companies upon which the commission has not yet reported. The railroad also protests, that the so-called tentative valuation does not include its materials and supplies on hand, cash on hand amounting to $343,-964 and other current assets amounting to $1,125,195; that it fails to include certain property used by the road for common carrier purposes, and makes no allowance for its value as a going concern, nor for the value of its lands for railroad purposes in excess of the value of adjacent property used for other purposes. While the tentative valuation stated the cost of reproduction new exclusive of land as $8,865,636, the road claims this item should not be less than $11,992,344.

Railway Revenues and Expenses, October, 1916

The net operating income of the railways of the United States for October, 1916, exceeded that for October, 1915, by $40 per mile, or 8.7 per cent, according to the compilation of the Bureau of Railway Economics.

Total operating revenues, $338,301,786, exceeded those for October, 1915, by $34,593,618. Operating expenses, $210,054,666, were greater by $22,980,134. Net operating revenue, $128,247,-120, made a gain of $11,613,484. Taxes, $13,989,231, increased by $1,939,705. Net operating income was $114,217,910 an increase of $9,697,509.

If spread over the mileage represented, operating revenues averaged $1,466 per mile, an increase of 10.8 per cent; operating expenses per mile, $910, were greater by 11.7 per cent; net operating revenue per mile, $556, increased 9.4 per cent; while net operating income per mile, $495, showed an increase of 8.7 per cent. Taxes per mile rose 15.5 per cent.

This summary covers 230,710 miles of operated line, or about 90 per cent of the steam railway mileage of the United States.

For the eastern railways, operating revenues per mile exceeded those for October, 1915, by 8.1 per cent; operating expenses rose 14.2 per cent; net operating revenue decreased 2.3 per cent; and taxes increased 17.8 per cent. Operating income per mile decreased 4.4 per cent.

For the southern railways, operating revenues per mile exceeded those for October, 1915, by 13.8 per cent; operating expenses rose 7.6 per cent; net operating revenue increased 26.1 per cent; and taxes 20.0 per cent. Operating income per mile increased 27.0 per cent.

For the western railways, operating revenues per mile exceeded those for October, 1915, by 12.9 per cent; operating expenses rose 10.6 per cent; net operating revenue increased 16.0 per cent; and taxes 12.4 per cent. Operating income per mile increased 16.5 per cent.

The four months of the current fiscal year, compared with the corresponding period of the preceding year, show changes per mile of line as follows: operating revenues increased 14.6 per

REVENUES AND EXPENSES OF STEAM ROADS—OCTOBER, 1916.

Compiled from monthly returns of the railways to the Interstate Commerce Commission and covering roads of Class I, i.e., roads with annual operating revenues above $1,000,000.

Account	United States				Eastern District				Southern District				Western District			
	Amount, 1916	Per mile of line		Increase over 1915 Per cent	Amount, 1916	Per mile of line		Increase over 1915 Per cent	Amount, 1916	Per mile of line		Increase over 1915 Per cent	Amount, 1916	Per mile of line		Increase over 1915 Per cent
		1916	1915			1916	1915			1916	1915			1916	1915	
Total operating revenues	$338,301,786	$1,466	$1,323	10.8	$146,807,871	$2,482	$2,296	8.1	$47,590,452	$1,116	$980	13.8	$143,903,463	$1,116	$988	12.9
Freight	245,486,354	1,064	961	10.7	104,466,872	1,766	1,664	6.2	35,523,389	833	740	12.6	105,496,093	818	711	15.0
Passenger	62,699,812	272	246	10.5	27,378,575	463	410	12.9	8,678,345	204	172	18.3	26,642,892	207	195	6.1
Mail	5,072,184	22	22	0.4	1,843,473	31	31	d0.7	730,173	17	15	13.6	2,498,538	19	20	d2.0
Express	8,170,017	35	28	24.6	3,830,098	65	53	22.8	1,055,819	25	20	21.7	3,284,100	25	20	28.2
All other	16,873,419	73	66	11.4	9,288,853	157	138	13.7	1,602,726	37	33	13.1	5,981,840	47	42	8.0
Total operating expenses	210,054,666	910	815	11.7	98,240,967	1,661	1,456	14.2	29,784,541	699	649	7.6	82,029,158	636	575	10.6
Maintenance of way and structures	38,420,945	167	154	8.0	15,987,223	270	255	6.1	6,199,250	145	126	15.7	16,234,472	126	117	7.3
Maintenance of equipment	52,866,974	229	205	11.6	25,723,493	435	381	14.2	7,930,905	186	183	1.5	19,212,576	149	132	13.0
Traffic	5,340,574	23	22	7.8	2,047,678	35	32	10.4	1,050,228	25	21	16.8	2,242,668	17	17	2.0
Transportation	104,580,473	453	399	13.6	50,215,771	849	726	17.0	13,383,984	314	292	7.3	40,980,718	318	283	12.2
General	7,225,973	31	28	12.3	3,188,629	54	47	14.1	1,155,076	27	25	8.6	2,882,268	22	20	12.1
All other	1,619,727	7	7	d4.9	1,078,173	18	15	19.4	65,098	2	2	d18.6	476,456	4	6	d33.5
Net operating revenue	128,247,120	556	508	9.4	48,566,904	821	840	d2.3	17,805,911	417	331	26.1	61,874,305	480	413	16.0
Taxes	13,989,231	61	53	15.5	5,589,364	95	80	17.8	1,968,709	46	30	20.0	6,431,158	50	44	12.4
Uncollectible revenues	39,979	*	*	....	12,453	*	*	....	7,716	*	*	....	19,810	*	*	....
Operating income	114,217,910	495	455	8.7	42,965,087	726	760	d4.4	15,829,486	371	292	27.0	55,423,337	430	369	16.5
Operating ratio—per cent—																
1916		62.1				66.9				62.6				57.0		
1915		61.6				63.4				66.2				58.2		
Average mileage represented—																
1916	230,710				59,129				42,641				128,940			
1915	229,476				59,045				42,134				128,297			

d Decrease. * Less than one dollar.

cent, operating expenses increased 13.5 per cent, net operating revenue increased 16.4 per cent, taxes increased 14.1 per cent and operating income increased 16.7 per cent.

Operating income per mile increased 7.6 per cent in the east, increased 24.0 per cent in the south, and increased 24.7 per cent in the west.

October operating income per mile was 8.7 per cent greater in 1916 than in 1915, 48.7 per cent greater than in 1914, 32.7 per cent greater than in 1913, and 12.2 per cent greater than in 1912.

Central Railway Club Dinner

The annual dinner of the Central Railway Club will be held at Buffalo on March 8. Among the speakers of the evening will be Major-General Goethals, president of the Panama Railway Company and the Panama Railroad Steamship Lines. A committee, with J. L. Randolph, vice-president of the Economy Devices Corporation, as chairman, is arranging for a special train from New York City to Buffalo on the evening of March 7.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings and places of meeting of those associations which will meet during the next three months. The full list of meetings and conventions is published only in the first issue of the Railway Age Gazette for each month.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, 455 Grand Central Station, Chicago. Next meeting, January, 1917, New York.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 20-22, 1917, Chicago.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual dinner, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

CINCINNATI RAILWAY CLUB.—H. Boutet, Chief Interchange Inspector, Cin'ti Rys., 101 Carew Bldg., Cincinnati. Regular meetings, 2d Tuesday, February, May, September and November, Hotel Sinton, Cincinnati.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh, Pa.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. W. Kelly, 349 Peoples Gas Bldg., Chicago. Next convention, March 19-22, 1917, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meeting, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—Geo. A. J. Hochgrebe, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—F. C. Stewart, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Pittsburgh Commercial Club Rooms, Colonial-Annex Hotel, Pittsburgh.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grand Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 a. m., Piedmont Hotel, Atlanta.

TOLEDO TRANSPORTATION CLUB.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria Hotel, New York.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Monday in month, except June, July and August, Hotel Sherman, Chicago.

WESTERN SOCIETY OF ENGINEERS.—E. N. Lavfield, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings. Annual meeting, 1st Wednesday after 1st Thursday in January, Chicago.

REVENUES AND EXPENSES OF RAILWAYS

Month of November, 1916

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Arizona Eastern	378	$277,558	$47,441	$256,725	$66,165	$34,236	$2,410	$65,911	$2,763	$13,244	$184,697	$172,028	$8,503	$162,785	$54,395
Detroit & Toledo Shore Line	81	144,691	.....	146,380	8,064	9,143	1,549	39,060	.....	3,204	61,020	85,360	7,050	78,310	2,050
Georgia	307	233,249	81,261	341,256	29,098	37,673	13,375	111,236	122	10,057	201,489	139,768	4,868	134,900	64,590
Kansas City, Mexico & Orient of Mo.	272	91,022	11,538	108,126	17,425	23,366	5,181	41,637	.....	6,139	93,750	14,376	6,000	8,360	148
Missouri, Oklahoma & Gulf	334	124,088	24,741	157,150	25,052	26,154	4,770	62,111	674	7,594	126,355	30,795	8,272	22,514	10,848
Oahn Railway & Land Co.	114	45,965	26,449	78,137	10,416	6,793	1,048	23,927	.....	5,732	47,829	30,308	4,488	25,820	10,699
St. Louis Southwestern	943	721,870	161,982	930,441	129,716	122,381	32,373	194,707	2,496	25,776	507,241	423,200	33,397	389,709	39,220
St. Louis Southwestern of Texas	810	347,095	113,135	496,489	96,541	87,313	13,899	182,661	1,308	20,355	400,079	96,410	17,160	79,244	1,273
Ulster & Delaware	129	49,618	11,602	78,628	14,147	11,301	911	36,290	376	3,501	66,527	12,101	4,000	8,101	—18,596

Five Months of Fiscal Year 1917

Arizona Eastern	378	1,349,802	230,238	1,699,010	277,959	163,841	11,843	325,065	12,798	64,644	855,711	843,299	68,107	774,344	221,416
Detroit & Toledo Shore Line	81	679,655	.....	686,597	45,435	41,532	8,019	180,322	.....	16,155	291,463	395,135	34,250	360,885	62,191
Georgia	307	1,078,031	380,414	1,576,689	121,928	211,093	68,607	516,476	625	47,056	965,298	611,391	24,343	586,990	320,293
Houston, East & West Texas	191	500,813	152,793	698,956	100,346	73,934	10,714	210,315	4,002	15,779	414,321	284,635	25,523	258,788	131,056
Illinois Central	4,766	23,352,163	6,348,515	32,275,936	4,832,526	7,272,458	539,181	9,381,433	182,371	798,332	22,906,629	9,369,307	1,663,000	7,700,375	2,275,890
Indiana Harbor Belt	109	.....	.....	2,025,808	243,748	217,091	14,136	794,278	.....	39,774	1,309,028	716,780	41,125	675,514	141,180
International & Great Northern	1,159	3,604,634	1,174,053	5,125,372	635,270	779,752	109,381	1,682,789	24,998	143,592	3,295,603	1,829,769	165,000	1,664,242	907,193
Kanawha & Michigan	177	1,227,137	170,808	1,441,180	211,573	405,581	15,206	365,679	37	34,513	1,032,589	408,591	70,300	338,283	—177,608
Kansas City, Mexico & Orient of Mo.	272	445,022	70,806	544,863	103,706	119,703	25,043	194,511	.....	29,150	472,113	72,750	30,060	42,627	35,775
Kan. C., Mex. & Orient Ry. Co. of Texas	466	457,122	101,141	591,159	90,671	109,316	18,986	249,715	.....	23,043	491,730	99,420	25,000	74,392	77,915
Kansas City Southern	837	3.822,645	737,522	5,030,666	531,886	633,690	138,807	1,444,795	.....	174,944	2,919,193	2,111,473	241,871	1,867,495	229,358
Lake Erie & Western	900	2,815,348	331,672	3,318,475	326,431	541,580	70,054	1,012,593	.....	62,782	2,013,441	1,305,033	138,000	1,166,399	382,241
Lehigh & Hudson River	97	855,513	38,924	969,400	139,305	144,059	7,480	328,698	.....	21,937	641,479	327,922	25,400	302,423	—61,461
Lehigh & New England	296	1,218,832	6,693	1,294,976	201,966	178,274	10,177	348,937	.....	33,298	772,403	522,572	46,800	475,751	—273,357
Lehigh Valley	1,444	18,224,275	2,202,024	21,878,947	2,703,437	3,757,216	420,177	8,000,639	87,323	412,697	15,366,750	6,512,197	781,500	5,729,269	—91,556
Long Island	397	1,897,126	4,282,981	7,143,954	718,747	677,807	70,314	2,609,267	35,240	170,747	4,275.727	2,868,227	367,134	2,494,585	260,053
Los Angeles & Salt Lake	1,154	3,160,786	1,298,144	4,885,003	432,689	702,454	157,914	1,310,864	95,259	96,417	2,748,757	2,136,246	253,445	1,882,340	271,870
Louisiana & Arkansas	279	492,423	100,458	614,396	129,523	91,034	18,611	173,243	.....	21,341	433,752	180,644	45.201	135,336	—92,365
Louisiana Ry. & Navigation Co.	342	765,872	138,408	953,948	142,420	112,077	33,331	301,064	.....	34,026	622,918	331,030	54,985	275,747	—16,074
Louisiana Western	208	783,317	321,524	1,172,723	106,225	173,688	37,081	265,386	8,878	33,744	624,694	548,029	59,253	487,686	183,514
Louisville & Nashville	5,071	20,438,984	5,643,080	27,918,335	3,695,738	5,144,625	600,802	7,954,048	100.403	573,372	18,008,531	9,909,805	1,104,985	8,801,795	1,707,811
Louisville, Henderson & St. Louis	200	522,842	194,067	760,707	149,588	116,890	24,576	214,912	.....	16,428	522,394	238,313	19,000	219,241	70,502
Maine Central	1,221	3,524,056	1,807,776	5,782,580	782,787	743,556	65,955	2,075,648	34,510	135,620	3,837,331	1,945,249	251,948	1,693,161	276,995
Michigan Central	1,846	12,788,208	5,202,454	20,363,024	2,302,377	2,877,583	348,749	6,958,122	296,345	368,532	13,151,708	7,211,316	710,000	6,498,122	1,535,543
Midland Valley	385	713,567	225,823	974,325	176,925	152,258	13,217	279,081	.....	33,616	654,771	319,554	29,668	289,050	73,715
Mineral Range	120	451,988	15,991	482,321	86,018	80,354	1,869	193,189	.....	7,708	369,138	113,183	16,500	96,683	—35,743
Minneapolis & St. Louis	1,647	3,693,576	894,674	4,872,187	699,777	725,236	89,684	1,564,609	427	119,342	3,199,075	1,673,112	210,647	1,461,821	48,859
Minn., St. Paul & Sault Ste. Marie	4,227	11,274,466	3,098,818	15,573,938	1,465,416	1,809,911	234,133	4,241,365	84,694	309,348	8,119,145	7,454,793	700,921	6,753,873	—67,647
Missouri & North Arkansas	365	381,888	189,497	610,732	86,693	69,974	19,621	187,033	.....	25,589	388,610	222,123	24,000	197,269	173,225
Missouri, Kansas & Texas System	3,865	11,380,652	4,295,914	17,281,502	3,321,534	3,193,587	304,778	5,363,386	107,679	485,815	12,772,280	4,509,222	631,210	3,869,682	406,067
Missouri, Oklahoma & Gulf	334	566,208	130,915	732,493	120,043	129,004	21,740	286,832	1,708	39,165	598,492	134,001	41,381	92,595	113,271
Missouri, Oklahoma & Gulf Ry. of Texas	134	132,315	2,789	136,043	15,955	14,226	8,542	52,657	.....	8,340	99,720	36,323	939	35,384	38,933
Missouri Pacific	3,931	11,558.073	2,347,477	15,064,034	2,680,964	3,024,337	374,801	5,034,119	44,220	340.595	11,469,971	3,594,063	560,442	3,026,007	349,684
Mobile & Ohio	1,160	4,180,798	629,795	5,101,761	643,623	1,272,568	183,708	1,681,261	12,105	157,083	3,950,347	1,151,414	193,395	957,248	—99,427
Monongahela	108	770,426	52,006	836,940	138,927	48,557	4,538	189,375	.....	20,692	402,088	434,852	41,000	393,852	7,178
Monongahela Connecting	6	.....	.....	558,000	101,299	77,127	1,500	286,182	.....	16,216	482,324	75,676	9,522	—32,723	—124,457
Morgan's La. & Tex. R. R. & S. S. Co.	401	1,647,021	490,280	2,281,772	278,674	352,994	57,605	727,707	10,808	58,590	1,484,895	796,877	113,332	681,346	367,695
Nashville, Chattanooga & St. Louis	1,237	4,191,307	1,297,119	5,933,200	648,461	1,051,595	258,415	1,889,511	50,504	181,761	4,077,033	1,856,167	145,500	1,708,691	458,749
Nevada Northern	165	830.794	61,989	918,066	116,501	73,034	3,678	143,198	449	24,552	361,411	556,655	22,832	533,823	162,453
New Orleans & North Eastern	204	1,269,470	263,205	1,706,821	182,898	297,548	49,768	480,163	39,124	61,449	1,110,298	596,523	88,800	507,723	102,003
New Orleans Great Northern	285	534,694	145,595	719,003	74,963	111,590	14,293	201,009	1,103	33,008	435,966	283,038	28,667	254,192	15,910
New Orleans, Mobile & Chicago	402	658,792	138,876	840,235	126,215	134,397	20,878	260,839	328	33,571	576,227	264,008	36,727	227,024	6,923
New Orleans, Texas & Mexico	191	451,333	119,903	590,667	104,117	96,654	28,406	157,368	.....	32,799	419,345	171,323	5,420	165,890	5,164
New York Central Railroad	6,073	59,476,283	24,099,966	97,162,393	9,623,165	16,890,658	1,393,185	30,174,224	1,350,125	2,020,095	61,451,452	35,710,941	3,860,027	31,841,751	2,736,762
New York, Chicago & St. Louis	571	5,603,498	735,977	6,604,414	596,167	1,627,578	253,825	2,632,891	25,333	138,703	5,273,082	1,331,332	210,000	1,121,226	—467,276
New York, New Haven & Hartford	2,005	16.693,414	13,924,425	35,150,947	4,061,343	4,336,992	211,843	12,830,830	478,579	855,660	22,770,121	12,380,826	1,309,000	11,069,335	354,476
New York, Ontario & Western	568	2,297,235	1,119,169	4,022,981	541,370	623,603	41,374	1,425,585	.....	93,829	2,722,001	1,300,980	125,000	1,175,954	—120,197
New York, Philadelphia & Norfolk	112	1,914,355	243,016	2,324,838	195,136	448,774	23,132	769,574	26,384	57,902	1,520,306	804,532	81,000	732,277	209,214

REVENUES AND EXPENSES OF RAILWAYS

FIVE MONTHS OF FISCAL YEAR 1917—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses							Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
New York, Susquehanna & Western	140	$892,895	$247,196	$1,292,099	$113,717	$175,248	$9,871	$586,689	.....	$35,119	$920,129	$371,970	$69,871	$302,024	—$113,844
Norfolk & Western	2,086	21,799,084	2,652,934	25,508,332	3,223,995	4,319,763	307,101	6,201,256	$51,382	423,859	14,447,082	11,061,250	1,175,000	9,885,726	574,327
Norfolk Southern	908	1,424,820	574,653	2,137,784	303,321	314,975	42,244	687,405	527	93,981	1,442,453	695,331	70,124	624,639	107,183
Northern Pacific	6,514	27,033,249	6,595,837	36,717,149	4,485,999	3,662,528	512,675	9,580,021	465,894	545,645	18,935,109	17,782,040	2,448,857	15,327,184	1,220,518
Northwestern Pacific	507	1,104,153	916,006	2,252,496	263,020	224,235	26,268	687,499	4,336	47,861	1,250,064	1,002,433	90,857	911,267	74,058
Oahn Railway & Land Co.	114	448,774	112,258	594,422	53,528	41,778	4,383	135,715	.....	24,882	260,163	334,259	42,488	291,771	—36,125
Oregon Short Line	2,254	9,357,432	2,248,528	12,526,416	1,214,951	1,103,646	162,940	2,632,378	163,215	299,402	5,559,364	6,967,052	757,500	6,209,094	1,378,165
Oregon-Washington R. R. & Nav. Co.	2,052	6,084,220	2,091,608	8,909,092	1,330,489	833,226	222,256	2,675,611	111,497	353,138	5,512,428	3,396,664	471,750	2,924,224	261,758
Panhandle & Santa Fe	670	2,061,355	461,132	2,634,869	345,577	383,534	20,648	612,527	.....	56,526	1,417,927	1,216,942	70,897	1,145,808	377,204
Pennsylvania Company	1,755	25,357,943	5,478,243	34,237,931	3,764,118	5,658,504	447,895	11,349,951	200,722	713,916	22,107,683	12,130,247	1,817,581	10,308,756	—236,997
Pennsylvania Railroad	4,534	70,952,846	19,915,983	99,908,829	12,559,726	19,457,793	1,058,809	33,859,741	1,367,964	2,366,806	70,632,878	29,275,950	3,810,506	25,444,321	—627,122
Peoria & Pekin Union	19	57,279	25,063	446,505	43,893	67,225	418	229,863	.....	14,304	355,703	90,803	35,000	55,801	11,830
Pere Marquette	2,249	6,946,615	2,053,276	9,937,388	943,991	1,813,446	179,675	3,335,901	25,963	217,060	6,512,933	3,424,455	255,137	3,164,459	419,195
Philadelphia & Reading	1,127	21,356,320	3,158,736	25,939,987	1,736,641	3,678,256	244,392	8,421,518	60,968	453,967	14,586,280	11,353,707	583,571	10,767,657	1,954,545
Philadelphia, Baltimore & Washington	717	5,884,835	4,308,968	11,202,736	1,436,078	2,145,141	142,454	4,190,526	651	268,402	8,175,888	3,026,848	324,718	2,701,424	289,976
Pittsburgh & Lake Erie	225	9,059,865	939,139	10,680,725	876,985	1,663,657	73,020	2,378,825	21,723	166,557	5,180,768	5,499,957	389,000	5,110,954	—25,823
Pittsburgh, Cincinnati, Chic. & St. L.	1,489	15,387,707	4,265,157	22,083,796	2,900,876	4,133,783	362,628	7,232,742	144,084	509,013	15,277,140	6,806,656	1,006,303	5,798,758	562,122
Pittsburgh, Shawmut & Northern	205	677,170	36,523	727,046	135,295	248,535	6,484	258,153	.....	21,606	670,074	56,972	11,111	45,861	—236,731
Port Reading	21	699,016	.....	814,718	53,680	88,721	192	296,802	.....	1,660	441,053	373,665	50,000	323,665	—39,374
Richmond, Fredericksburg & Potomac	88	841,435	466,978	1,477,011	127,819	188,661	19,319	483,151	10,937	39,832	869,720	607,291	47,357	559,865	158,667
Rutland	468	883,597	595,132	1,732,485	195,558	277,360	51,891	558,390	6,326	34,784	1,124,309	608,177	86,303	521,868	29,734
St. Joseph & Grand Island	258	801,569	139,758	998,445	138,165	121,630	22,021	283,078	2,790	24,128	591,813	406,632	39,753	366,646	226,080
St. Louis, Brownsville & Mexico	548	1,318,192	833,997	2,271,602	256,741	189,531	45,320	546,172	.....	48,927	1,083,348	1,188,254	40,000	1,147,613	780,508
St. Louis-San Francisco ‡	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Iron Mountain & Southern	3,555	12,114,939	3,319,518	16,558,181	3,031,310	2,481,298	348,030	4,234,424	47,648	330,187	10,400,448	6,157,732	672,744	5,479,606	1,780,351
St. Louis Merchants' Bridge Terminal	9	.....	1,905	1,138,034	181,129	77,551	4,034	466,015	.....	36,528	765,257	372,777	43,851	328,849	67,447
St. Louis, San Francisco & Texas	244	381,551	159,247	570,625	103,471	99,917	11,956	213,258	.....	24,604	453,207	117,418	7,907	109,396	42,686
St. Louis Southwestern	943	3,129,638	742,942	4,091,257	362,083	654,313	155,405	915,627	14,597	123,185	2,222,811	1,868,447	174,304	1,693,546	343,157
St. Louis Southwestern of Texas	810	1,652,796	527,413	2,346,554	308,546	476,480	70,448	795,723	7,914	102,041	1,756,509	590,044	84,644	505,163	200,596
San Antonio & Aransas Pass	726	1,555,858	516,373	2,195,423	312,785	258,270	35,435	800,262	.....	63,078	1,468,180	727,243	100,000	627,178	230,157
Seaboard	3,459	7,287,851	2,167,764	10,470,264	1,323,645	1,670,463	394,421	3,481,752	50,355	306,336	7,185,139	3,285,125	515,141	2,765,628	.....
Southern	6,983	22,174,281	7,740,006	32,840,658	4,959,164	4,740,440	849,180	10,128,827	196,144	904,758	21,591,621	11,249,037	1,301,365	9,938,036	1,522,457
Southern in Mississippi	281	297,136	175,685	514,517	114,613	46,034	11,611	186,043	.....	17,705	376,006	138,512	41,750	96,512	37,259
Southern Pacific	7,063	38,608,470	12,624,409	55,796,747	5,050,989	7,794,895	849,410	17,528,378	788,421	1,224,586	33,077,322	22,719,425	2,492,052	20,203,131	344,809
Spokane, Portland & Seattle	555	1,555,564	695,673	2,473,648	263,328	209,270	41,563	524,905	22,976	75,243	1,134,260	1,339,388	287,225	1,051,696	27,868
Tennessee Central	295	528,742	184,214	755,783	117,309	99,067	29,224	255,089	.....	32,945	533,634	222,149	22,840	199,129	79,411
Terminal R. R. Assn. of St. Louis	37	.....	1,375	1,262,408	144,879	88,223	4,377	363,622	.....	16,417	617,518	644,889	164,359	479,787	4,428
Texas & New Orleans	468	1,497,298	513,236	2,184,612	247,933	382,674	42,028	667,977	46,041	54,642	1,440,466	744,146	87,629	655,995	310,142
Texas & Pacific	1,944	6,510,886	2,496,132	9,595,364	1,019,412	1,266,170	202,426	3,250,649	58,938	269,549	6,056,196	3,539,169	414,000	3,123,647	1,014,014
Toledo & Ohio Central	436	2,418,350	290,524	2,927,082	360,164	579,221	37,021	952,512	9,251	51,913	1,990,082	937,000	120,280	816,553	205,559
Toledo, Peoria & Western	248	300,435	187,135	535,452	83,748	147,195	12,799	184,472	.....	20,549	448,763	86,689	32,500	54,189	—4,724
Toledo, St. Louis & Western	451	2,250,263	239,125	2,617,482	440,341	358,897	82,905	807,919	.....	46,799	1,728,363	889,119	93,500	795,542	102,546
Ulster & Delaware	129	213,556	203,526	511,251	63,630	60,553	7,921	210,179	1,629	17,859	361,770	149,481	20,000	129,513	—42,897
Union Pacific	3,622	24,423,714	5,021,354	32,306,440	4,145,809	3,562,576	507,102	7,376,432	480,680	702,163	16,635,778	15,670,662	1,473,000	14,196,194	3,021,222
Union R. R. of Baltimore	8	717,208	130,699	857,032	69,463	.....	.....	30,457	.....	11,494	111,414	745,618	41,010	704,608	156,418
Union R. R. of Pennsylvania	32	.....	.....	2,694,592	168,033	518,842	563	1,053,983	.....	22,688	1,763,070	931,522	57,702	873,820	—127,035
Vandalia	917	4,050,198	1,198,323	5,902,622	820,834	1,071,835	126,966	1,927,026	58,220	131,493	4,129,048	1,773,574	219,336	1,553,231	298,686
Vicksburg, Shreveport & Pacific	171	474,978	241,338	805,678	100,673	134,445	19,287	220,397	10,353	26,163	511,112	294,566	52,540	242,026	110,802
Virginian	310	3,308,105	222,241	3,749,102	359,445	541,163	28,506	803,886	77,466	79,636	1,881,860	186,725	165,000	1,702,208	458,168
Wabash	2,519	11,892,764	3,340,955	16,580,320	1,727,101	2,411,223	457,372	5,581,948	95,187	349,330	10,577,075	6,003,245	517,665	5,484,044	1,615,528
Wabash-Pittsburgh Terminal	63	501,578	46,731	590,353	96,559	80,872	9,115	161,621	9,414	32,501	390,082	200,272	39,922	160,349	77,751
Washington Southern	36	280,762	269,372	712,623	69,241	74,940	7,156	227,815	4,747	17,632	401,531	311,092	21,707	289,376	95,424
West Jersey & Seashore	359	1,090,461	2,602,331	3,993,710	628,065	541,056	70,322	1,372,344	15,148	86,616	2,713,385	1,208,325	192,709	1,085,663	23,767
Western Maryland	773	4,531,027	511,318	5,419,388	579,075	755,941	116,719	1,661,114	64,130	112,263	3,286,805	2,132,583	165,500	1,967,083	550,018
Western Pacific	939	3,285,592	528,359	4,037,004	566,861	348,712	99,729	1,053,484	52,062	94,902	2,215,749	1,821,255	160,965	1,660,115	1,199,928
Western Ry. of Alabama	133	337,345	186,894	586,957	78,440	109,376	32,201	152,627	9,269	22,074	403,958	182,999	30,665	152,201	42,976
Wheeling & Lake Erie	512	3,873,058	306,076	4,549,865	664,586	634,290	47,690	1,405,104	7,905	79,100	2,838,675	1,711,189	204,298	1,506,814	265,455
Wichita Valley	257	304,361	118,058	441,310	74,400	41,715	484	123,727	.....	6,556	246,882	194,428	19,450	174,954	—15,681
Yazoo & Mississippi Valley	1,382	5,200,418	1,406,951	6,938,170	1,039,378	901,479	103,433	1,895,168	10,095	162,489	4,093,955	2,844,214	285,000	2,558,488	804,366

‡ Taken out of hands of receiver on November 1, 1916. Reorganized as St. Louis-San Francisco Railway Co.

Traffic News

The Traffic Club of Chicago held its annual banquet on January 24.

The Erie Traffic Students' Club, an organization of about 50 employees of the Erie in Chicago, held its first annual banquet at the Kaiserhof hotel in that city, on January 11.

Various railroad passenger associations have informed the committee in charge of transportation arrangements for the inauguration ceremonies at Washington on March 5 of reduced round trip rates to Washington for the occasion of 1½ cents a mile good from March 1 to March 10. The Southeastern Passenger Association has announced that, on application, this period may be extended for 30 days.

According to D. H. Davis, representative of the Lumber Manufacturers' Agency at Chicago, his company shipped on December 21 a car containing 51,778 ft. of lumber from Winlock, Wash., to St. Louis, Mo. Although this performance is exceptional, the Lumber Manufacturers' Agency is loading all cars more heavily than formerly. In December, 1916, the average load of 74 cars shipped was 27,027 ft.. as compared with an average of 23,400 ft. for shipments in December, 1915, and 22,700 ft. in 1914.

The total freight carried through the Sault Ste. Marie canals in 1916 amounted to 91,888,219 short tons, of which about 18,000,000 tons passed westbound, and the remainder eastbound. The traffic was 29 per cent greater than that of 1915, which aggregated 71,290,304 short tons. Contrary to the general belief that less coal was handled in 1916 than a year ago, 2,210,219 short tons of hard coal, and 13,912,900 short tons of soft coal, passed through the canals in 1916, or an increase over 1915 of 9 and 23 per cent, respectively.

The Corporation Commission of Oklahoma issued an order on January 22, providing for a demurrage scale of $1, $2 and $3, respectively, for the first three days after free time, and a $3 charge for all succeeding days. The Railroad Commission of Texas postponed its hearing on demurrage rates until March 9. The Public Service Commission of Wyoming postponed its hearing on demurrage until February 9, and the hearing on the same subject before the Montana Railroad & Public Service Commission was postponed until February 13.

The Merchants' Association of New York City has asked the Department of Commerce at Washington to investigate the status of legislation governing the handling and storage of explosives, in connection with interstate commerce; especially as related to the situation in and around New York harbor and to the several recent explosions in that vicinity. The letter, sent by the association to the Secretary of Commerce, says that the laws of the State and the regulations of the Interstate Commerce Commission do not constitute an effective means of regulation.

A Texas correspondent writes that the controversy which has existed for some time between members of the State Railroad Commission and the railroads of Texas over the action of the roads in promulgating freight rates on intrastate business which complied with the order of the Interstate Commerce Commission in the Shreveport case, will soon be amicably settled. The Texas commission—or at least two members thereof, a majority—in order to force the roads to withdraw the tariffs, refused to have anything to do with the roads or to act on any application until the rates were cancelled. The railroads, under this "strike" situation, found themselves powerless, and they finally decided to withdraw the tariff complained of.

Reconsignment Charges on Coal Advanced

Following the close of the hearing before Commissioner Funk on January 17, the State Public Utilities Commission of Illinois issued an order granting in toto the rules proposed in the application of the carriers for increased charges for reconsigning coal, coke and coal briquettes. The order, however, is a temporary one, expiring on April 1. Further hearings are expected to be held on the matter of establishing permanent rules and rates to govern the reconsignment of coal. The temporary order contains the following main provisions:

A $2 charge will be made for reconsignment in transit prior to arrival at the original destination or the terminal yard serving the destination, except when a single change in destination within a single switching district is received in time to permit instructions being given to yard employees prior to the arrival of the car, or when orders for diversion are given on shipments originating within a switching district before they leave the yard at which the road haul begins.

A $2 charge will be made for a single change in destination within given switching limits if orders are received in time to permit instructions being given yard employees within 24 hours after the arrival of the car at the terminal yard.

A $2 charge will be made when a car is stopped prior to arrival at original billed destination at the request of the shipper or consignee, in which case the point where the car is stopped will be considered the destination of the freight.

A $5 charge will be made on reconsignments, after arrival, to points outside the switching limits of the destination. A like assessment will be made for the reconsignment of cars within a switching district if orders are received subsequent to 24 hours after arrival.

Railroads Co-operate to Move Chicago Coal

As previously noted in the *Railway Age Gazette*, the State Public Utilities Commission of Illinois called a conference of Chicago railway executives on January 18, for the purpose of considering means of expediting the movement of coal cars within the Chicago switching district. After suggestions had been offered by both the Commission and the carriers, and assurances had been given by the roads that they would co-operate with the Commission in any measures it chose to take in the matter, an order was entered, effective at 5 p. m., January 19, requiring that the railroads treat coal as a preferred class of freight, with priority of movement over all other traffic except food, live-stock and perishables, and that as far as practicable the transportation of coal be continued by the line haul carrier over the switching and connecting lines to the tracks of the line making the final delivery.

One of the suggestions made by the railways in the conference was that they be authorized to embargo all reconsignments of coal shipped to Chicago until the present emergency has passed. It was asserted that the degree in which it causes congestion cannot be adequately measured by the number of cars reconsigned, as the singling out of a relatively small number of cars necessitates pulling the hold tracks many times. This proposal was denied by the Commission, which had already entered a separate order in the reconsignment case, mentioned elsewhere in this issue.

Among the spokesmen for the railroads was Marvin Hughitt, Jr., vice-president of the Chicago & North Western, who pointed out that an important cause of the coal famine in Chicago, so far overlooked, was the lack of storage room for coal in residences, apartment houses, hotels, office buildings, industrial plants and in the yards of coal dealers. The railroads are not entirely to blame, he said, when occasionally they fail to meet the hand-to-mouth needs of these consumers. It was brought out by other speakers that a number of Chicago lines had already made coal a preferred class of traffic. J. H. Brinkerhoff, general superintendent of the Belt Railway of Chicago, said that for some time Chicago & Eastern Illinois and Illinois Central coal trains had been operated over his line with the aid of pilots furnished by the Belt. He also said that the Belt was handling all the cars it could possibly handle and that the relative number of coal cars it had on its rails depended entirely upon the deliveries to it by connecting lines. If connections would hold back cars loaded with other commodities and make larger deliveries of coal cars, the Belt would necessarily handle relatively more coal traffic. Following his remarks several representatives of the carriers stated that they would hold other commodities in their yards for the benefit of coal movement.

Shortly after the utilities commission issued its order the Chicago coal teamsters declared a strike. For over 24 hours not a wagon or truck load of coal was moved in the city. At the present time the differences between the employers and employees seem temporarily patched up, but the men threaten to strike again at any moment if their demands are not met.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission has reopened the case in which it had previously ordered the Pennsylvania and other railroads to divest themselves of the ownership of steamship lines in Chesapeake bay. The action was taken on petition of the Board of Trade and the Merchants', Shippers' and Receivers' Association of Baltimore.

The commission has announced a hearing to be held at Washington on March 1 for the purpose of permitting all persons interested to show cause as to why a further extension should or should not be granted of the period within which railroads are required to complete the equipment of their freight cars in accordance with the provisions of the safety appliance acts.

Demurrage on the New Haven

A proposed rule of the New York, New Haven & Hartford and affiliated lines provides that, when cars are held in transit short of billed destination or on storage tracks at destination because of the failure of consignees to unload within the free time cars placed for delivery, the published demurrage charges will apply on the cars so held, and no additional free time will be allowed after final placement; *Held*, That the proposed rule has not been justified. (42 I. C. C., 126.)

Export Grain Case

Opinion by Commissioner Hall:

In the commission's original report, 37 I. C. C., 190, it held that proposed increased carload rates on grain, grain products, and by-products from central freight association territory and certain points in Wisconsin, Iowa, Missouri, and Kentucky to Atlantic ports for export had not been justified. Upon rehearing and in the light of additional evidence, these increased rates are now found justified. (42 I. C. C. 523.)

Rates on Cement

Lehigh Portland Cement Company v. Baltimore & Ohio Southwestern, et al. Opinion by Commissioner McChord:

Certain prescribed rates on cement in carloads from Mitchell, Ind., to Kentucky junctions are found on rehearing not to be too low generally, but to require some modification. Rates from Fordwick, Va., and Kingsport, Tenn., found discriminatory in comparison with the rates prescribed from Mitchell. Fourth section applications denied in part and granted in part. (42 I. C. C., 406).

I. C. C. Asked to Prevent State Discrimination Against Interstate Traffic

C. E. Schaff, receiver of the Missouri, Kansas & Texas, has filed a petition with the Interstate Commerce Commission asking it to make an investigation and issue such orders as may be necessary to prevent discrimination against interstate passengers caused by the rapidly increasing practice of using the lower state fares, in the states which have 2-cent fares, to evade the payment of the lawful interstate through rates. This illustrates the conflict between state and federal jurisdictions in rate-making which the railroads have emphasized in their presentation to the Newlands Joint Committee on Interstate Commerce, in advocating exclusive federal regulation of rates.

Mr. Schaff in his petition points out that the intrastate rates fixed by the legislatures or state commissions in Missouri, Kansas and Oklahoma are 2 cents a mile, while the interstate rates in this territory as prescribed by the Interstate Commerce Commission are 2.4, 2.6 and 3 cents per mile and that passengers evade and defeat the lawfully published through interstate fares by purchasing tickets at the lower state rates to stations located at or near the boundary lines and then rebuying tickets to destination. He says that the Missouri, Kansas & Texas has endeavored to maintain the lawful interstate fares and has declined to hold trains at border points to enable passengers to get off and purchase state tickets, but that the practice of evading the interstate rates has been encouraged by state authorities and has grown to such an enormous extent as to result in a serious loss of revenue.

Mr. Schaff complains not only of the discrimination against interstate passengers, but against his road, because he says his competitors have not made the same effort to maintain the interstate fares and a great deal of traffic has been diverted from his line to competing roads into Kansas City, Mo., because his road is so situated that passengers from Kansas cannot repurchase tickets at Kansas City, Kans. The petition declares that "relief cannot be had except under an order of the commission requiring the removal of the discrimination now existing in favor of state passenger traffic and against interstate passenger traffic resulting from unreasonably low interstate rates."

The commission is asked to conduct an investigation and after a full hearing "enter such orders as may be necessary to relieve interstate passenger traffic of the unlawful burden and discrimination now existing against same resulting from the maintenance of lower state rates, from the acts of interstate passengers in evading interstate fares, as well as the acts of state commissions and other state authorities in promulgating orders and decrees for the express purpose of facilitating and encouraging the evasion of the interstate schedules."

Southeastern Lumber

Opinion by Commissioner Harlan:

Proposed increased rates on lumber from points in Mississippi valley territory and southeastern territory to points in central freight association territory and in Wisconsin are found to have been justified.

The fact that these rates represent in many cases the sums of the separately established rates to and from the Ohio River gateways, or to and from Thebes or St. Louis, does not in itself establish their unreasonableness. Upon all the facts of record, the conclusion is reached that the through rates have been justified.

Complaints alleging unreasonableness in the rates on lumber from Memphis and points in the delta section south of Memphis and alleging an improper grouping of the points in the delta section are held not to have been sustained.

A proposed revision of through rates on lumber from Memphis and from Helena, Ark., to points in certain of the States embraced within western trunk line territory found to have been justified in part. (42 I. C. C. 548.)

The Jersey City Freight Rate Complaint

The hearings held by Examiner LaRoe, in New York City, on the demands of Jersey City for lower freight rates, as compared with New York City, have been taken up during the past week largely with the evidence, presented in behalf of New York City, concerning the large sums which have been expended by the city and state of New York for the improvement of traffic conditions in New York city and harbor, which expenditures have been of benefit to New Jersey without any corresponding expenditure on the part of that state. Frank M. Williams, state engineer of New York, testified as to the importance of the Erie Canal, furnished at the expense of New York, as an element in the prosperity of the city. He presented figures showing that the total expenditures on the New York canals up to the present time, have been more than $675,000,000. He set forth the influence of the Erie Canal in keeping down to a low basis the rates on freight by rail from the west to New York.

T. H. Whitney, a member of the New York State Public Service Commission, testified concerning the extensive improvements in transit, especially for passengers, which have been made in New York City; improvements made possible only by the immense wealth of the city, enabling it to borrow large sums, and these improvements in New York have benefited New Jersey.

W. S. Kallman, assistant freight traffic manager of the New York Central, told of the inter-relation of freight rates to New York with those to Boston, Philadelphia, Baltimore and other cities, and the inextricable confusion which would arise if a change were made in these relations.

E. P. Bates, assistant freight traffic manager of the Pennsyl-

vania, explained the reasons for differences between the rates to Philadelphia and those to New York and to points between.

A. S. Learoyd, general freight agent of the Delaware, Lackawanna & Western, told how the rates made by the New York Central to New York City compelled reductions in rates by the Lackawanna, reductions absolutely necessary to get any competitive New York business. Similar testimony was given in behalf of the Erie.

Prof. Emory R. Johnson, of the University of Pennsylvania, author of books on the science of transportation, was called to the stand by the counsel for the State of New York. Professor Johnson explained the fundamental reasons for the prominence of New York as a commercial center; and, in answer to questions, showed how northern New Jersey had benefited by the natural advantages of New York harbor. He told how the present relations of rates from the west to the different cities had been the result of costly rate wars between the railroads. The present arrangement of differentials is the result of a compromise between irreconcilable forces; it is as logical and just as it is possible to secure under the present economic conditions.

COURT NEWS

The New York Supreme Court, Third Appellate Division, in a decision by Justice Cochrane, in the Lancaster Machine & Knife Works case, has decided that the Public Service Commission of the State has no power to order the operation of an industry track for a shipper when the track is not on the property of the railroad company itself. The construction and operation of such tracks are matters of private agreement between the shipper and the railroad; an agreement over which the Commission has no jurisdiction. The Commission, however, has power, under the statute, to order a railroad to make proper connections between its lines and such side tracks. Presiding Justice Kellog dissented. The case was decided by the Public Service Commission in May, 1914, with Commissioner Hodson dissenting. The court now sustains the contentions of Commissioner Hodson. The Lancaster Machine & Knife Works owned and operated a factory at Lancaster, N. Y., to which the Erie Railroad ran a spur over the Knife Works' own property, but in 1911 the railroad demanded an agreement covering this track. The shipper objected and complained to the Commission. The Commission will take the case to the Court of Appeals.

Notice of Injury to Live Stock

The Illinois Appellate Court holds that the duty required of a shipper by a contract providing that recovery for injury to live stock shall be barred unless notice thereof is given to the carrier within five days is reasonable, and compliance with it is not onerous; and the failure to do so is fatal to the right to recover for the injury.—Sweetser v. Chicago & Alton, 196 Ill. App. 623.

Infant Trespasser on Track

The Supreme Court of New Hampshire holds that a boy of four years going into a railroad yard and upon a switching track, was a trespasser, the fact that he was an infant making no difference; and the railroad owed him only the duty of exercising ordinary care to avoid injuring him if it knew of his presence in a dangerous situation, or if its failure to learn of it was due to its culpable ignorance.—Nappi v. Grand Trunk (N. H.), 99 Atl., 185.

Stop, Look and Listen Rule

In an action for personal injuries to the driver of an automobile at a grade crossing, it appeared that the trees of an orchard and a heavy growth of sunflowers made it impossible for the driver to see up and down the track until he was almost on it. The plaintiff was asked if he had stopped or looked or listened. He answered that he did not; that he could not have seen the train if he had, unless he had got out of his car and walked up to the track. The District Court of Appeal, Third District, California, held that he did not exercise that due care for his own safety which the law demanded of him. It was his duty to stop and look and listen at some point where such conduct would be effective. Common prudence under such circumstances would dictate that he bring his machine to a full stop before attempting to cross the track. But to exercise due care, under the situation as revealed by him, assuming his testimony to be true, the consensus of the opinion of prudent men would require him, if necessary to ascertain whether his life was in danger, to get out of his car and go forward a few feet on foot in order that the matter might be placed beyond peradventure.—Thompson v. Southern Pacific (Cal.), 161 Pac. 21.

Lease of Part of Right of Way for Warehouse

The South Carolina Supreme Court holds that a railroad has the right to lease a portion of its right of way to a shipper for use as a warehouse and storage room, in connection with the shipping of cotton seed over its line, where the ground in question is used for collecting and facilitating the moving of freight; as the use comes within the term "for railroad purposes."—Shelton v. Southern Cotton Oil Co. (S. Car.), 90 S. E. 751.

Discrimination by Wrong Classification

Where a railroad issued two bills of lading for a shipper's machinery and furniture, respectively, the South Carolina Supreme Court holds that the fact that the whole was shipped in the same car did not have the effect of making it a carload lot of either machinery or furniture or of both, and the road and the shipper could not lawfully agree to that effect. The court said: "Every commodity must be shipped according to its true classification as made by the carrier or the railroad commission. . . . If shipper and carrier are allowed by agreement to vary classifications and call a commodity what it is not, the door is thrown open to discrimination."—Byrd v. A. C. L. (S. Car.), 90 S. E. 181.

Dayton Flood Case

A bill of lading exempted the carrier from loss by act of God, and was issued on the lower of two rates. The goods were delayed through the negligence of a connecting carrier, so that, when they arrived at the destination they could not be unloaded because of a heavy rain; and they were damaged by water at the time of the Dayton flood (1913). In an action for damages against the initial carrier the Maine Supreme Judicial Court holds that the carrier was not liable under the Carmack Amendment, the proximate cause of the damage being the flood, and not the carrier's negligence. Continental Paper Bag Co. v. Maine Central (Me.), 99 Atl., 259.

Initial Carrier

In an action against the Western Transit Company for damages to a carload of freight it appeared that the plaintiff shipped the carload from Mankato to Duluth over the Omaha road, which delivered it to the plaintiff at Duluth. The plaintiff then delivered it to the Western Transit for transportation to Hartford, Conn., and received a bill of lading. It was damaged after the Western Transit had delivered it to a connecting carrier. The Omaha did not know that it was to be carried beyond Duluth. The Minnesota Supreme Court holds that the Western Transit was the initial carrier within the purview of the Carmack Amendment.—Victor Produce Co. v. Western Transit Co. (Minn.), 160 N. W., 248.

Look and Listen Rule

In an action for the death of the driver of an automobile which ran into the engine of an express train at a village crossing near a station, it was alleged that certain buildings and box cars were negligently placed so as to obstruct the view of travelers approaching the crossing. The Nebraska Supreme Court holds that the erection and maintenance of convenient structures for the use of the patrons of a railroad at a public station is not negligence under ordinary circumstances.

It was held that if the deceased had been looking out for his own safety he had ample opportunity to see the approaching train from several points along his route in time to prevent the accident. If it were conceded that there was some actionable negligence on the part of the railroad company, or its servants, still there could be no recovery. A traveler on the highway who, being aware of an approaching train at a crossing, attempts to beat the train over the crossing, must suffer the consequences

of his own experiment. It is the duty of a traveler at a crossing to assume a present danger which includes the immediate approach of a train within a dangerous distance. The duty of due care is not discharged unless the traveler looks and listens at a place where looking and listening will be effective, unless a reasonable excuse exists for failing so to do. It was conclusively shown that either the deceased did not look and listen for the approaching train, or that, if he did so, he undertook to cross in front of an eminently threatening danger which he must have both heard and seen. In the one case he was guilty of inexcusable negligence, and in the other of inexcusable recklessness. In either event he was guilty of such contributory negligence as precluded recovery.—Rickert v. Union Pacific (Neb.), 160 N. W. 86.

Hours of Service Act

The Circuit Court of Appeals, Eighth Circuit, holds that the Atchison, Topeka & Santa Fe's two telegraph offices in its yard at Guthrie, Oklahoma, one at Guthrie and the other at South Guthrie, four-tenths of a mile apart, the Guthrie office being operated from 7 p. m. to 7 a. m. and the South Guthrie office from 7 a. m. to 7 p. m., must be deemed a single office within the hours of service act. By the continuous alternation the two operators conducted all the interstate telegraphic business in the yard district, and each of them remained on duty 12 hours, the work being transferred from one to the other regularly; in other words, the law limits the workday for each operator to nine hours.—A. T. & S. F. v. United States, 236 Fed., 906.

Subsidies in Aid of Railroads

In an action by taxpayers to enjoin a county from collecting taxes against their property to pay a subsidy voted to the Cincinnati, Buffalo & Chicago, the Indiana Supreme Court holds that a stipulation in a contract to pay a subsidy in aid of construction of a railroad, and one that the company shall permanently maintain its line to and its terminals and shops in a city, are independent and not dependent, so that, the road, shops and terminals being constructed, and put in operation, the obligation to pay the subsidy is not released by the insolvency of the road, but enforcement of the agreement for permanent maintenance, in case of nonobservance, is matter for a proper action. Judgment for the defendant was affirmed.—Zintsmaster v. Gill (Ind.), 114 N. E. 210.

Switches for Abutting Mills

The Indiana Supreme Court holds that the statute of that State providing that a carrier may be required to construct on its property a switch [track] when necessary to accommodate the business of any elevator or mill abutting on its line where there is no space for the proprietor to construct it on his own property, does not authorize the public service commission to require a railroad to construct a switch [track] for a mill which is separated from the right of way by a public street although there was evidence that the millowner owned the fee of the street; since the purpose of the Legislature was the elimination of the necessity of a wagon haul, and there is nothing in the act to indicate an intention to use the term "abutting" in any but its ordinary sense of touching, meeting or coming together.—Chicago & E. I. v. Public Service Commission (Ind.), 114 N. E. 414.

Alighting from Moving Train

A passenger on a vestibule train was notified by the brakeman, who had promised to let him off on the side opposite from the station, that his stop had been reached. The brakeman opened the door and the trap, and, without waiting for a stop, the passenger prepared to alight, starting down the steps holding to the rail on the opposite side from the direction in which the train was going, and carrying his grip in his other hand. He either slipped off or was, in trying to recover himself at the last moment, thrown from the train, his hold on the rail turning him with his back towards the front, so that his body swung outward and his grasp on the rail was broken. In falling he struck on his head and was killed. In an action for his death the Circuit Court of Appeals, Ninth Circuit, holds that, as a matter of law, he was guilty of contributory negligence in attempting to alight while the train was in motion; for an adult passenger, who knowingly and unnecessarily attempts to alight from a train while it is in motion, ordinarily is chargeable with contributory negligence as a matter of law, and the deceased's manner in going on the steps was negligent.—Murray v. Southern Pacific, 236 Fed., 704.

Look and Listen Rule

In an action for personal injuries to a pedestrian struck by a switch engine while at a crossing in Milwaukee on a dark night, the Wisconsin Supreme Court holds that, as against the negligence of the crossing flagman in not giving reasonable warning, lack of ordinary care on the part of a traveler is a complete defense. It holds that it is the duty of a traveler using a crossing to look and listen at the last opportunity before entering the zone of danger, and the circumstance that gates are raised which are customarily lowered when a train is about to pass, does not excuse the failure to look and listen. The plaintiff looked once up and down the track before crossing. It is held that the question whether ordinary care required him to keep on looking until he had crossed all the tracks, in view of the seeming assurance of safety given him by uplifted gates bearing lanterns, and a lack of warning by the flagman, was for the jury.—Waterson v. C. M. & St. P. (Wis.), 160 N. W. 261.

Hours of Service Act

The federal district court for the southern district of Iowa holds that under the hours of service act absolute releases of employees for periods not exceeding 2½ hours occurring at meal times does not, where the employees were engaged for over 16 hours, operate to break the continuity of service and avoid the penalty for violation of the act. But as the railroad company had arranged these periods of rest for the purpose of complying with the law and was acting in good faith, the court treated the case as a test case where the railroad should not be made to suffer a heavy penalty, and the road was fined only $100 for each violation. The court said that it was not prepared to hold that an absolute release for two hours at a time, other than at meal time, would not be such a period as might be considered "substantial and opportune" for rest. No arbitrary period can be fixed.—United States v. Minneapolis & St. Louis, 236 Fed. 414.

Assumption of Risk

Four men engaged in cutting steel rails and repairing tracks had made a cut in a rail with a chisel and dropped it to break it, when it fell on the foot of another employee who was coming to help them. The New Jersey Court of Errors and Appeals, in an action against the railroad, holds that the plaintiff had assumed the risk, under the rule that an employee assumes the risk of such dangers attending the prosecution of his work as he knows, or could discover by the exercise of ordinary care for his personal safety, and from hurt happening to him from those dangers the employer is not responsible. The court pointed out the distinction between contributory negligence and assumption of risk. Contributory negligence involves the notion of some fault or breach of duty on the part of the employee. On the other hand, assumption of risk, even though the risk be obvious, may be free from any suggestion of fault or negligence on his part.—Cetola v. Lehigh Valley (N. J.), 99 Atl. 310.

Embankments and Surface Water

The Boulder Valley constructed a solid embankment over marshy ground, which was maintained for over eight years before the Union Pacific bought the right of way at foreclosure sale. The embankment sometimes, in cases of high water, impounded water on adjoining land, though there were no well-defined water-courses. Thereafter this adjoining land was sold by its owner, and neither the purchaser nor his lessee requested the Union Pacific to remove the embankment or provide outlets. They sued the company for injuries to their crops by the impounding of waters. The Circuit Court of Appeals, Eighth Circuit, held the railroad not liable. When the purchaser bought the land and the lessee leased it, they knew that the embankment was there, that it was a permanent structure, and would prevent any flood waters from running off the land, and no doubt that fact was taken into consideration in determining its value.—Union Pacific v. Campbell, 236 Fed. 708.

Safety Appliance Acts

The federal courts hold that the safety appliance acts do not apply to mere switching operations, but the federal district court for the western district of Kentucky holds that under these acts, the movement of a string of cars for some distance through the yards on (main) tracks used by regular trains in interstate commerce was not a mere switching operation. The cars were being transferred from the yards of one company to those of another, and the string of cars must be considered a train. To run this train without connecting the power brakes on 85 per cent of the cars with the engine, was in violation of the acts. The question in this last Kentucky case was whether the "string of cars" was a "train."

The stipulated facts [the case was submitted to the court on stipulated facts without the intervention of a jury] are that this transfer from the Hancock street yard to the incline called the "hump" was over tracks used for the main line movements of the Big Four passenger trains in both directions, and that the transfer from the incline to Floyd street and west thereof was over the tracks used by the Big Four and Chesapeake & Ohio for main line passenger trains in both directions and also for the movement of freight trains by the Illinois Central between its various yards. The air brakes on the cars were not used.

The map shows many tracks through the region between Hancock and First streets (a distance of five city blocks), but those used for the movement of the strings of cars are not isolated from the other tracks, nor are they specially set apart for this class of operations. The distance over which the transfers were made here were not so great as those cited from former cases, but, says the court, "we think the length of track is not the material factor. Rather that factor is the character of the other uses to which the track is put. The other uses are the things which increase the dangers against which the law provides a measure of protection."—United States v. Louisville & Jeffersonville Bridge Co., 236 Fed. 1001.

Commission Cannot Order Construction of New Lines

The decision of the California Supreme Court, heretofore briefly reported, annulling an order of the California Railroad Commission, requiring the Atchison, Topeka & Santa Fe to construct and put into operation a railroad between Oceanside and Temecula, is number L. A. 4537 and dated October 23, 1916. The Santa Fe's predecessor, the California Southern (which had been bought at foreclosure sale) had formerly operated a line here, but in 1891 the tracks had been washed out by a flood and were never rebuilt; and both the commission and the court expressly relieve the Santa Fe from any obligation to build a line now because there had been one there twenty years ago. It is not a question of restoration.

The court held that the commission had no power to make the order. A railroad, the court said, "may be compelled to furnish proper stations for the reception and discharge of passengers and freight, to supply adequate motive power and cars, to install safety devices, to make needful repairs and additions to its roadbed and track, and other like improvements. All of these matters fall within the scope of the regulation of the service which the company has bound itself to give. But there is a vital distinction between regulation of this character and a requirement that the railroad company shall extend its operations by building a new line of road to accommodate a territory which has not theretofore had the benefit of direct railroad service.

"Such a requirement cannot be justified by saying that the points to be thus reached are within the area already served by the railroad. The area served by any railroad may, in a certain sense, be said to include all of the territory, in any direction, from which freight or passengers may be brought to the railroad by any other mode of conveyance. Such area may extend to a distance of many miles from the line of the road. Certainly the public duty of the company does not include the obligation of building lines to any or every portion of this indefinite expanse of territory.

". . . The supervision of service rendered by a railroad company is a proper matter for public regulation and control. The question whether a railroad company shall extend its lines to points not theretofore reached by it, whether, in other words, it shall engage in a new and additional enterprise, is one of policy to be determined by its directors. To compel a railroad company to use its money to build, and operate a line of railroad which it does not desire to construct or operate is to take its property."

The court quoted the recent case of Great Northern v. Minnesota, 238 U. S. 340, where it was said: "A railroad's possessions are subject to its public duty, but beyond this and within charter limits, like other owners of private property, it may control its own affairs."—Atchison, Topeka & Santa Fe v. California Railroad Commission (Cal.), 160 Pac., 828. The Railroad Commission has appealed the case to the Supreme Court of the United States.

UNITED STATES SUPREME COURT

Hours of Service Act

The Supreme Court of the United States, in a decision handed down December 18, 1916, has sustained a verdict of $45,000 against the Baltimore & Ohio for injuries to a freight conductor. The action was begun in the Illinois State courts, and was based on the hours of service and the employers' liability acts. It was alleged that the plaintiff was kept on duty for more than sixteen hours, and fourteen hours later was put on duty again; and was injured because he was so exhausted as to be unable to protect himself in the work that he was attempting to do. The facts, as stated briefly by the United States Supreme Court on appeal, were that the plaintiff was intending to cut out from a train a car with a hot box. He stood on the running board at the end of the tender of an engine moving backward on a side track, until it drifted abreast of the car standing on the main track, when he stepped off and was badly hurt.

Mr. Justice Holmes, in delivering the opinion of the Court, said: "At the trial the judge instructed the jury that if they found that the defendant company had been guilty of the breach of duty alleged, and that the breach proximately contributed to the plaintiff's injury, then they should not consider negligence, if any, on the part of the plaintiff, in determining the amount of the plaintiff's damages, if any. In other words, under Section 3 of the employers' liability act, the judge allowed a violation of a statute enacted for the safety of employees to be found to exclude contributory negligence, although at the time of the accident the violation was fourteen hours old.

"The first step in the railroad's real defense was that the plaintiff was not kept on duty more than sixteen hours, a proposition that there was substantial evidence to maintain. But that having been overthrown by the verdict, it contends that the injury must happen during the violation of law or at least that the hours of service law fixes the limit of possible connection between the overwork and the injury at ten hours; this by the provision that an employee, after being continuously on duty for sixteen hours, shall have at least ten consecutive hours off. It also objects that the plaintiff, if feeling incompetent to work, should have notified the defendant. But no reason can be given for limiting liability to injuries which happen while the violation of law is going on; and as to the ten hours, the statute fixes only a minimum and a minimum for rest after work no longer than allowed. It has nothing to do with the question of the varying rest needed after work extended beyond the lawful time. In this case there was evidence that whether technically on duty or not the plaintiff had been greatly overtaxed before the final strain of more than sixteen hours, and that as a physical fact it was far from impossible that the fatigue should have been a cause proximately contributory to all that happened. If so, then by the employers' liability act, Sections 3 and 4, questions of negligence and assumption of risk disappear."—Baltimore & Ohio v. Wilson.

The foregoing is an abstract based on the published decision; but an inquiry for further details brings out the fact that an unusually narrow space between the tracks where the man was injured was undoubtedly a factor in the case, the conductor's lawyers claiming that he had not had reasonable notice of this abnormal condition. Again, his injuries were unusually grave; were of a kind making it seem miraculous that he survived at all. And, thirdly, it appeared that the conductor had had opportunity to sleep, off duty, only about 4½ hours out of the 84 hours preceding the accident. A part of this time he had been deadheading on passenger trains and on freight trains; and some of the deadheading was under such conditions that, it is said, he could not sleep. [Nothing is said as to how much he may have slept while in his caboose on duty]. The lawyers and judges did much fine hairsplitting over the relation of the periods of deadhead time to the limitations for work- and for rest-time prescribed by the hours of service law. These apparently are some of the conditions which led to the judicial approval of this very large verdict. The accident occurred at Peninsula, O., August 23, 1913.

Railway Officers

Executive, Financial, Legal and Accounting

D. P. Williams, general solicitor of the Vandalia, has been appointed assistant general counsel of the Pennsylvania Lines West, with office at St. Louis, Mo.

John Ryan, general manager of the Tonopah & Tidewater, with headquarters at Stagg, Cal., has also been elected president of this company and his office transferred to Oakland, Cal.

Benjamin W. Scandrett, assistant general attorney of the Union Pacific, with office at Omaha, Neb., has been appointed general attorney of the Northern Pacific, with headquarters at St. Paul, Minn.

G. G. Dodge has been appointed freight claim agent of the United Railways of Havana, the Havana Central, the Western of Havana and the Havana Terminal, with headquarters at Havana, Cuba.

James P. Elmer, formerly general passenger agent for the Chicago Great Western, but out of railway service for several years, has been appointed assistant general freight agent for that company, with headquarters at Minneapolis, Minn., succeeding O. F. Spindler, transferred.

Operating

E. T. Kennan has been appointed superintendent of car service for the Pennsylvania Lines West of Pittsburgh, succeeding W. N. Prall, retired on a pension.

O. E. Pearson has been appointed assistant superintendent of transportation of the Chicago, Burlington & Quincy with headquarters at Omaha, Neb., succeeding George W. Covert, assigned to other duties.

J. H. McKinnon, district freight and passenger agent of the Duluth, Winnipeg & Pacific, with headquarters at Duluth, Minn., has been appointed general superintendent with headquarters at Winnipeg, Man.

J. J. Jordan has been appointed trainmaster of the Sacramento division of the Southern Pacific with headquarters at Roseville, Cal. L. C. Gram has been appointed trainmaster of the Coast division with offices at San Jose, succeeding P. Slater, promoted.

J. A. Somerville, superintendent of transporation of the Missouri Pacific, with office at St. Louis, Mo., has been appointed general superintendent of transportation, with the same headquarters, effective January 15. The office of superintendent of transportation has been abolished.

In connection with the regrouping of the Southern Railway lines for purposes of administration the following appointments to the position of assistant to vice-president, with authority on all lines, reporting to E. H. Coapman, vice-president in charge of operation, have been made, effective January 17: G. W. Taylor, now general superintendent of transportation; J. Hainen, now general superintendent of motive power and equipment; F. W. Brown, now assistant to the general manager; T. H. Gatlin, now assistant chief engineer of maintenance of way and structures; H. H. Laughton, now auditor; W. H. Gatchell, now superintendent of agencies; Alex. Grant, now general superintendent of mail transportation, and W. M. Netherland, now assistant to the general manager.

James E. McLean, master mechanic of the Kansas City Southern, with headquarters at Pittsburg, Kans., has been appointed general superintendent of the United Verde & Pacific, with office at Clarkdale, Ariz., succeeding N. E. Bailey, resigned to go to another company. He was born at Truro, Nova Scotia, on January 26, 1865, and entered railway service there with the Intercolonial in 1880. A few years later he went to the United States, where he entered the service of the Southern Pacific as a machinist at Tucson, Ariz. Later he was advanced to foreman, master mechanic and assistant superintendent. In 1910 he was appointed master mechanic of the Kansas City Southern and in February, 1912, he went to the Galveston, Harrisburg & San Antonio as assistant superintendent, with office at San Antonio, Tex. He returned to the Kansas City Southern in March, 1913, as master mechanic, and retained that position until his recent appointment as general superintendent of the United Verde & Pacific.

W. S. Andrews, general superintendent of transportation of the Alabama Great Southern, the Cincinnati, New Orleans & Texas Pacific, and the Harriman & North Eastern, has been appointed general superintendent of transportation of the Southern Railway, Lines West, with headquarters at Cincinnati, O. W. T. Caldwell, superintendent of the Cincinnati, New Orleans & Texas Pacific, with headquarters at Danville, Ky., has been appointed general superintendent of the southwestern district of the Southern Railway, Lines West, with headquarters at Chattanooga, Tenn. W. S. Melton has been appointed superintendent of telegraph, and T. R. Griffin, chief special agent of the Lines West, both with headquarters at Cincinnati, O. C. E. Ervin, roadmaster of the Southern Railway at Atlanta, Ga., has been promoted to superintendent of the Atlanta division of the Lines West, with headquarters at Atlanta, Ga., succeeding E. E. Norris, promoted. C. M. Mitchell, trainmaster of the Cincinnati, New Orleans & Texas Pacific at Danville, Ky., has been promoted to superintendent, with headquarters at Danville, Ky. These changes are effective January 17.

W. M. Cowhig, superintendent of freight transportation of the Southern Railway, with headquarters at Washington, D. C., has been appointed general superintendent of transportation, with headquarters at Charlotte, N. C. H. L. Hungerford, superintendent, with headquarters at Greenville, S. C., has been appointed general superintendent of the eastern district of the Lines East, with headquarters at Charlotte, N. C. E. E. Norris, superintendent at Atlanta, Ga., has been appointed general superintendent of the middle district of the Lines East, with headquarters at Knoxville, Tenn. J. A. Jones has been appointed superintendent of telegraph, and J. W. Connelly, chief special agent, both with headquarters at Charlotte, N. C. H. E. Hutchens, superintendent of passenger transportation of the Southern Railway, with headquarters at Washington, D. C., has been promoted to inspector of passenger transportation of both the Lines East and West, with headquarters as before, at Washington. G. R. Buddin, trainmaster at Alexandria, Va., has been appointed superintendent of the Washington division of the Lines East, with headquarters at Alexandria, succeeding W. C. Hudson, who has been transferred to Asheville, N. C., as superintendent of the Asheville division. Mr. Hudson succeeds F. S. Collins, who becomes superintendent of the Columbia division, with headquarters at Columbia, S. C. W. J. Wassum, who has been superintendent at Columbia, will be superintendent of the Charlotte division, with headquarters at Greenville, S. C., succeeding H. L. Hungerford promoted. J. A. Rathburn, trainmaster at Princeton, Ind., has been appointed superintendent tonnage bureau, all lines, and W. I. Leatherland has been appointed assistant superintendent tonnage bureau, all lines, both with headquarters at Washington.

Engineering and Rolling Stock

P. Alquist, superintendent of the car department of the Missouri, Kansas & Texas, with headquarters at Denison, Tex., has resigned to take a similar position with the Pere Marquette at Detroit, Mich., effective February 1.

B. Herman, chief engineer of maintenance of way and structures of the Southern Railway, with headquarters at Washington, D. C., has been appointed chief engineer, maintenance of way and structures of the Southern Railway, Lines East, with headquarters at Charlotte, N. C., effective January 17.

L. B. Jones, assistant engineer of motive power of the Pennsylvania Railroad at Williamsport, Pa., has been appointed master mechanic with office at Verona, vice J. C. Glass, transferred. G. J. Richards, enginehouse foreman at West Brownsville Junction, has been appointed assistant master mechanic at Vernon, succeeding D. E. Cassidy, transferred.

E. C. Sasser, superintendent of motive power of the Southern Railway, with headquarters at Washington, D. C., has been appointed superintendent of motive power of the Lines East, with headquarters at Charlotte, N. C. W. S. Murrian, superintendent of motive power, with headquarters at Knoxville, Tenn., will take the position of superintendent of motive power, both for the Lines East and West, with headquarters as heretofore, at Knox-

ville, Tenn. E. G. Goodwin has been appointed fuel agent of the Lines East, also with headquarters at Knoxville. W. H. Dooley, superintendent of motive power of the Alabama Great Southern, the Cincinnati, New Orleans & Texas Pacific, and the Harriman & North Eastern, has been appointed superintendent of motive power of the Southern Railway, Lines West, with headquarters at Cincinnati, O. R. D. Quickel has been appointed fuel agent of the Lines West, with headquarters at Cincinnati, O. The above changes are effective January 17.

Traffic

John M. McDermott has been appointed industrial agent of the Baltimore & Ohio, with office at Chicago, Ill.

L. L. Johnson has been appointed agricultural commissioner and industrial agent of the Atchison, Topeka & Santa Fe, with headquarters at Amarillo, Tex.

R. E. Cook has been appointed assistant general freight agent of the Pennsylvania Lines West, with headquarters at Pittsburgh, Pa., succeeding S. C. Matthews, assigned to other duties.

A. B. Waldron, commercial agent of the Texas & Pacific, with office at Paris, Tex., has been appointed division freight agent at Fort Worth, Tex. He will be succeeded as commercial agent at Paris by J. D. Healy.

George Bristow, division passenger agent of the Chicago Great Western at Des Moines, Ia., has been promoted to assistant general passenger agent with the same headquarters, and the position of division passenger agent has been abolished.

In connection with the regrouping of the lines of the Southern Railway for administrative purposes, the following changes have been made in the traffic department: Randall Clifton, assistant freight traffic manager with headquarters at Washington, D. C., has been promoted to freight traffic manager with headquarters also at Washington. George P. Biles, freight traffic manager of the Cincinnati, New Orleans & Texas Pacific and the Harriman & North Eastern, has been appointed freight traffic manager of the Southern Railway with headquarters as heretofore at Cincinnati, Ohio. E. H. Shaw, assistant freight traffic manager of the Southern Railway at Atlanta, Ga., has been promoted to freight traffic manager with headquarters also at Atlanta. R. L. McKellar, assistant freight traffic manager with headquarters at Louisville, Ky., has been promoted to foreign freight traffic manager with headquarters at Louisville. E. T. Steele, freight traffic manager of the Alabama Great Southern, has been appointed freight traffic manager of the Southern Railway with headquarters at Birmingham, Ala., as heretofore. George K. Caldwell, general freight agent of the Southern Railway at Washington, has been promoted to assistant freight traffic manager, also at Washington. H. A. Poveleite, general freight agent of the Cincinnati, New Orleans & Texas Pacific and the Harriman & North Eastern, has been appointed assistant freight traffic manager of the Southern Railway with headquarters at Cincinnati. The following additional appointments to the position of general freight agent of the Southern Railway have been made: At Birmingham, Ala., J. W. Hunter, formerly assistant general freight agent at the same place; at Cincinnati, Ohio, F. D. Claggett and J. B. Ford, formerly assistant general freight agents of the Cincinnati, New Orleans & Texas Pacific; at New Orleans, La., J. B. Bannon, formerly general freight agent of the New Orleans & Northeastern; at Washington, D. C., C. E. Bell, formerly assistant general freight agent at Atlanta, Ga., and F. H. Behring, formerly assistant general freight agent at St. Louis, Mo.; at New York, J. E. Fitzwilson, formerly general agent at New York, and at Charlotte, N. C., Walter Shipley, formerly division freight agent at Macon, Ga. Additional appointments to the position of assistant general freight agent have been made as follows: At Louisville, Ky., R. H. Morris, formerly commercial agent at Chicago; at Cincinnati, Ohio, F. S. Riegel; at Richmond, Va., Wins F. Wilson, formerly commercial agent. Division freight agents have been appointed as follows: At New Orleans, La., R. H. Tate, formerly division freight agent of the New Orleans & Northeastern; at Macon, Ga., C. A. Russell, formerly district freight agent at New Orleans; at Augusta, Ga., Ralph Shropshire. The following appointments have been made in the passenger traffic department: W. H. Tayloe, passenger traffic manager, and H. F. Cary, general passenger agent at Washington, D. C., will be in charge of traffic in the territory east of the line from Cincinnati to Mobile via Chattanooga, Birmingham and Meridian. W. A. Beckler, general passenger agent of the Queen & Crescent, has been appointed passenger traffic manager of the Southern Railway and E. A. Aiken, assistant general passenger agent of the Queen & Crescent, has been promoted to general passenger agent of the Southern Railway. Mr. Beckler and Mr. Aiken will have headquarters as before, at Cincinnati, Ohio, and will be in charge of traffic on and west of the line from Cincinnati to Mobile. Stanton Curtis, assistant general passenger agent of the Southern Railway with headquarters at Chicago, has been transferred to St. Louis, Mo. G. C. Kelleher, general passenger agent of the New Orleans & Northeastern, has been appointed assistant general passenger agent of the Southern Railway with headquarters as heretofore, at New Orleans, La. J. R. Wells, formerly district passenger and ticket agent of the New Orleans & Northeastern, has been appointed district passenger agent of the Southern Railway. The titles of traffic manager and general passenger agent of the New Orleans & Northeastern at New Orleans, and of assistant general passenger agent at Chicago, have been abolished. Other officers of the freight and passenger traffic departments of the Southern Railway, the Cincinnati, New Orleans & Texas Pacific and the Alabama Great Southern have been appointed officers of the Southern Railway with the same titles and headquarters as at present.

James Gilmore Carlisle, whose appointment as general freight agent of the Central of Georgia with headquarters at Savannah, Ga., has already been announced in these columns, was born on January 19, 1873, at Irwinton, Ga., and was educated in the common schools of Wilkinson county, Ga. He began railway work in May, 1890, as a clerk on the Central of Georgia, at Macon, Ga., and has been in the continuous service of that road ever since. In 1893, he was appointed soliciting agent, and in 1896 became traveling passenger agent. From 1897 to 1901 he served as commercial agent and subsequently as chief clerk to the general freight agent. In 1902 he again became commercial agent, remaining in that position until 1910 when he was appointed division freight agent. Three years later he was promoted to assistant general freight agent at Savannah, Ga., which position he held at the time of his recent appointment as general freight agent of the same road, as above noted.

J. G. Carlisle

Purchasing

H. E. Rouse, general storekeeper of the Chicago Great Western, with headquarters at Oelwein, Iowa, has resigned to take a position in the purchasing department of the Mark Manufacturing Company, Chicago, Ill.

H. Shoemaker, district storekeeper of the Baltimore & Ohio, at Wheeling, W. Va., has been appointed district storekeeper of the Southwest district and the Cincinnati, Hamilton & Dayton with headquarters at Cincinnati, Ohio, vice H. P. McQuilkin, promoted to chief clerk to the general storekeeper at Baltimore, Md., vice A. R. Portlock, deceased. W. C. Ware has been appointed district storekeeper, Wheeling district and Newark division, vice H. Shoemaker, promoted.

OBITUARY

A. B. Brinkerhoff, general agent for the Chicago & North Western at Chicago, Ill., for over 20 years, died at his home in Huntley, Ill. on January 18, at the age of 80.

Equipment and Supplies

LOCOMOTIVES

THE CHEMIN DE FER DU MIDI (France) has ordered 40 Consolidation locomotives from the American Locomotive Company. These locomotives will have 23 by 26-in. cylinders, 56-in. driving wheels, and a total weight in working order of 161,000 lb.

THE BUFFALO, ROCHESTER & PITTSBURGH, reported in last week's issue as having ordered 30 locomotives from the American Locomotive Company, placed orders with that company for 22 Mallet, 3 Pacific and 5 eight-wheel switching locomotives. Of the 22 Mallet type locomotives, 16 will have 23½ and 37 by 32-in. cylinders, 57-in. driving wheels, and a total weight in working order of 427,000 lb. The other six Mallet type locomotives will have 28 and 44 by 32-in. cylinders, 57-in. driving wheels and a total weight in working order of 548,000 lb. The three Pacific type locomotives will have 24½ by 26-in. cylinders, 57-in. driving wheels, and a total weight in working order of 262,000 lb. The five eight-wheel switching locomotives will have 22 by 28-in. cylinders, 51-in. driving wheels, and a total weight in working order of 207,000 lb.

FREIGHT CARS

THE VIRGINIAN has ordered 1,000 hopper cars from the Pressed Steel Car Company.

THE E. E. WHITE COAL COMPANY has ordered 100 cars from the Pressed Steel Car Company.

THE DETROIT, TOLEDO & IRONTON has ordered 50 hopper cars from the Pressed Steel Car Company.

THE STANDARD OIL COMPANY has ordered 50 gondola cars from the Standard Steel Car Company.

THE BROYER SMOKELESS COAL COMPANY has ordered 100 cars from the Pressed Steel Car Company.

THE CHICAGO, MILWAUKEE & ST. PAUL is in the market for 250 50-ton flat and 250 40-ton refrigerator cars.

THE ST. LOUIS-SAN FRANCISCO is reported as having ordered 106 box cars from the Standard Steel Car Company.

THE NORTHERN PACIFIC, reported in the *Railway Age Gazette* of December 26 as inquiring for refrigerator and gondola cars, has ordered 500 refrigerator cars from the Pullman Company, and 500 gondola cars from the Pressed Steel Car Company.

CHICAGO, MILWAUKEE & ST. PAUL.—The Griffin Wheel Works will furnish the wheels for 1,000 freight cars which the Chicago, Milwaukee & St. Paul will build in its own shops. It was erroneously stated in a recent issue that the Griffin Wheel Works would furnish the trucks.

PASSENGER CARS

THE CHICAGO, BURLINGTON & QUINCY is inquiring for 15 70-ft. baggage cars.

THE BOSTON ELEVATED, reported in the *Railway Age Gazette* of December 15 as having issued inquiries for 35 subway cars, has ordered these subway cars from the Pressed Steel Car Company.

THE DELAWARE, LACKAWANNA & WESTERN, reported in the *Railway Age Gazette* of January 5 as having issued inquiries for 10 express cars, has ordered these cars from the Pullman Company.

IRON AND STEEL

THE LACONIA CAR COMPANY, Boston, Mass., has issued inquiries for 15,000 tons of car steel.

THE UNION PACIFIC has ordered 32,000 tons of steel rails for 1917 delivery from the Illinois Steel Company.

THE NORTHERN PACIFIC has ordered 1,570 tons of structural steel from the American Bridge Company for various bridges.

THE ATLANTIC COAST LINE is taking bids on the construction of a bridge over the James river which will require over 6,000 tons of steel.

THE ATCHISON, TOPEKA & SANTA FE has bought 126 tons of steel from the American Bridge Company for one span of a bridge on the Topeka branch at Holliday, Kan.

MISCELLANEOUS

THE LOUISVILLE & NASHVILLE has placed a contract with the Roberts & Schaefer Company for the equipment for an automatic reinforced concrete locomotive coaling plant with a "RandS" gravity sand plant for immediate installation at Paris, Tenn.

SIGNALING

THE WABASH RAILWAY is to install a Union mechanical interlocking at Alvordton, Ohio; 21 working levers and 3 spare spaces.

PENNSYLVANIA.—An interlocking plant, with G R S model 2B signals, is to be installed at Dravosburg, Pa.; six mechanical levers and thirteen electric.

FORT SMITH & WESTERN.—The General Railway Signal Company will install for this road an interlocking plant at the crossing of the Missouri, Kansas & Texas at Crowder, Okla.

THE MISSOURI, KANSAS & TEXAS is to make an extensive installation of automatic block signals near Parsons, Kan. The material will be furnished by the Union Switch & Signal Company.

THE EL PASO & SOUTHWESTERN has ordered from the Union Switch & Signal Company the material necessary to install the extensive additions to its automatic block signals, recently announced.

THE CHESAPEAKE & OHIO has ordered from the Union Switch & Signal Company the material for its new mechanical interlocking to be installed at Kellogg, W. Va. There will be 2 mechanical levers and 10 electrical.

THE DELAWARE, LACKAWANNA & WESTERN is installing at Orange, N. J., an electro-pneumatic interlocking plant, furnished by the Union Switch & Signal Company. The machine has 20 working and 11 spare levers.

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.—This road has just received from the General Railway Signal Company a complete electric interlocking to replace the plant recently destroyed by fire at Harriman Junction, Tenn.

THE NORFOLK & WESTERN is to make an extensive installation of automatic block signals, worked by alternating current on the Bristol-Pulaski division, in Virginia. The Union Switch & Signal Company furnishes the material.

THE PENNSYLVANIA LINES west of Pittsburgh have ordered from the Union Switch & Signal Company the material for a new mechanical interlocking at Toledo Junction, O.; the machine will have 35 levers and 21 spare spaces.

THE BALTIMORE & OHIO has ordered from the Union Switch & Signal Company material for a large interlocking at Halethorpe, Md. There will be a 32-lever Saxby & Farmer mechanical and a 32-lever electric machine. A similar machine, somewhat smaller, has been ordered for Mountain Lake Park, Md.

CHICAGO & NORTH WESTERN.—The General Railway Signal Company is installing for this road, at Washington street, Milwaukee, Wis., an electric interlocking machine, 128 levers, model 2. This is a junction of two double track lines, the Madison division and the Wisconsin division, and also a crossing with the four-track line of the Chicago, Milwaukee & St. Paul.

GERMAN RAILWAY WOMEN TO SALUTE.—The railway director at Danzig has, it is said, issued the following order: "It has been noticed that the female employees on the railroads do not always take their work earnestly enough, nor does their exterior seem above approach. I therefore direct that all women wearing railway uniform, and also those only entitled to the uniform cap, must now greet their superiors in military fashion by putting the right hand to the headgear."

Supply Trade News

Richard L. Thomas, president of B. M. Jones & Co., Boston, Mass., died January 3.

Frederick S. Bennett, for many years associated with the Railroad Gazette and the Railway Review, died in Chicago, Ill., January 19.

H. G. Brinckerhoff has recently become associated with the Engineer Company, New York, and is in charge of its work in the New England states, with headquarters at 10 High street, Boston.

The Gulick-Henderson Company, consulting and inspecting engineers and owning physical and chemical laboratories, announces the removal and consolidation of its general offices from 30 Church street and 120 Broadway to 13-21 Park Row, New York, suite 1932 to 1939.

W. W. Coleman, chief engineer of the T. George Stiles Company, Arlington, N. J., since last June, has been elected vice-president and a director of the company. Mr. Coleman is a graduate of the public schools of Pittsburgh, and he took a course in engineering at the Park Institute, Allegheny, Pa. He was first connected with the railway signal business when he was in the office, shop and testing rooms of the Union Switch & Signal Company. He subsequently spent four years in other lines, but returned to the signal company, and for two years was associated with J. P. Coleman in the designing of new apparatus. He was later made assistant to John D. Taylor and at the beginning of the Pennsylvania terminal work in New York he became connected with the New York office of the company and assisted in designing special apparatus for the Hudson & Manhattan and the Pennsylvania tunnels and terminal. He left the services of the Union Switch & Signal Company, however, early in 1913 when he was appointed sales engineer for the Edison Storage Battery Company. He was subsequently sales engineer for the General Railway Signal Company until June, 1916, when, as above noted, he became associated with the T. George Stiles Company as chief engineer.

W. W. Coleman

The Berger Manufacturing Company, Canton, O., has adopted a new advertising symbol which will be used in all the publicity of this company in the future. The symbol was chosen in a contest won by Miss M. A. Goodwin, a student in the Chicago School of Applied and Normal Arts.

William Berdan, at one time secretary and treasurer of the Cooke Locomotive Works, since made a part of the American Locomotive Company, and for the past 20 years vice-president of the Paterson Safe Deposit & Trust Company, died at his home in Paterson, N. J., January 21, aged 68 years.

W. L. Batt has been made sales manager of the Hess-Bright Manufacturing Company, Philadelphia, and will have entire charge of its sales after February 1, 1917. Mr. Batt has been connected with the Hess-Bright manufacturing organization since its early days, and has for many years engaged in doing much of the pioneer work that was necessary to develop the industry in this country.

Colonel Herbert Hughes C. B., C. M. G., of Sheffield, Eng., a director of the firm of William Jessop & Sons, Inc., New York, died recently in England at the age of 64 years. Colonel Hughes was lord mayor of Sheffield in 1905-1906, and was prominently associated with the volunteer forces in England. He was at one time a member of the Advisory Board at the War Office. He represented the British government at the International Conference on Trade Marks, held at Washington, D. C., a few years ago. He was well known in legal and commercial circles in New York and at Washington.

Walter J. McBride, formerly president of the Haskell & Barker Car Company, Michigan City, Ind., died at his home in Chicago, January 18, at the age of 56. He was born on May 2, 1861, and entered commercial life at the age of 16, as an office boy with the Peninsula Car Company, Detroit, Mich. He was with that company for nearly 15 years and at the time of its consolidation with the Michigan Car Company, Detroit, was elected secretary of the new corporation. In 1899, when the American Car & Foundry Company was organized, he was elected auditor and shortly thereafter promoted to assistant to the president and later to vice-president and general manager. In 1907, he resigned as vice-president of the American Car & Foundry Company to become associated with the late John H. Barker, president of the Haskell & Barker Car Company, as vice-president. At the death of John H. Barker, he became president of the company and continued in that position until the sale of the corporation to the present owners in 1916.

W. J. McBride

American Locomotive Company

At a meeting of the board of directors of the American Locomotive Company, held January 17, the following officers were elected, effective February 1: Columbus K. Lassiter, vice-president in charge of manufacture; Harry B. Hunt, assistant vice-president in charge of manufacture; James D. Sawyer, vice-president in charge of sales; Joseph Davis, vice-president and comptroller.

Sylvanus L. Schoonmaker, chairman of the company, on January 20 issued the following notice to the stockholders:

The board of directors of your company submit the following report of the result of the company's operations during the first half of the current fiscal year:

	Six months to Dec. 31, 1916	Six months to Dec. 31, 1915	Increase
Gross earnings	$37,863,594	$14,398,859	$23,464,735
Manufacturing, maintenance and administrative expense and depreciation	32,326,743	11,413,702	20,913,041
	$ 5.536,851	$ 2,985,157	$ 2,551,694
Interest, etc., on bonds of constituent companies, notes, etc.	83,517	128,667	* 45,150
Profit	$ 5,453,334	$ 2,856,490	$ 2,596,844
Reserve for United States munitions and income taxes and Canadian war taxes for the calendar year 1916	1,822,500	28,750	1,793,750
Profit available for dividend	$ 3,630,834	$ 2,827,740	$ 803,094
Dividends on preferred stock for six months	875,000	875,000	.....
Dividends on common stock for six months	625,000	.....	625,000
Surplus profit	$ 2,130,834	$ 1,952,740	$ 178,094

* Decrease.

The company has on its books, unfilled orders amounting to $75,746,377.

Car Heating Patent Suits

The Chicago Car Heating Company, Chicago, announces that, by a recent decision of the commissioner of patents in the interference suit between the Chicago Car Heating Company and the Consolidated Car Heating Company, dating from 1908 over certain vapor heating system patent claims, the contentions of the Chicago Car Heating Company were sustained in all respects. The decision has now become final from which no appeal has been or can be taken, and the Cosper Application (owned by the Consolidated Car Heating Company) has been abandoned, and no patent will be granted to the Consolidated Car Heating Company relating to any matter involyved in that interference.

There still remains in litigation the Chicago Car Heating Company's suit against the Gold Car Heating & Lighting Company, in the U. S. District Court of New York, for infringement of vapor heating system patents; and also suit of the Chicago Car Heating Company against the Standard Heat & Ventilation Company, in the U. S. district court of Chicago, for infringement of vapor heating system patents.

TRADE PUBLICATIONS

LOCOMOTIVE DEVICES.—The Franklin Railway Supply Company, New York, in series E bulletin 600, illustrates and describes the Franklin automatic adjustable driving box wedge, and in series C bulletin 401, McLaughlin flexible conduits.

TRANSIT REFRIGERATION.—A bulletin recently issued by the Refrigerator Car Equipment Company, Chicago, entitled "Waste in Transit Refrigeration Transformed into Efficiency and Profits" describes the company's A B C system of transit refrigeration.

FABROIL GEARS, formerly known as the cloth pinons, form the subject of a profusely illustrated descriptive bulletin, No. 48702, of the General Electric Company. Commercial data on "Fabroil" gears and useful information for gear calculations are given in bulletin No. 48703.

WASHING AND COOLING AIR.—A rather attractive booklet, bulletin No. 150, recently issued by the Spray Engineering Company, Boston, Mass., deals with Spraco equipment for washing and cooling air for steam turbine generators. The booklet describes the company's water-spray type of air-washer and cooler, taking up the details of its construction and operation. A number of views of the air-washers are shown in operation and in course of construction.

BALL BEARING HANGERS.—The latest catalogue issued by the S. K. F. Ball Bearing Company, Hartford, Conn., bears the title S. K. F. Self-aligning Ball Bearing Hangers and Pillow Blocks. The booklet contains 48 well illustrated pages and takes up in detail such subjects as Power Saving, the Use of Smaller Motors, Saving in Lubrication and Inspection, Reduced Fire Hazard, etc. Several pages are devoted to tables and curves and engineering data on mounting, lubrication, testing lubricants, felt seats, etc. Announcement is also made of the S. K. F. engineering service.

RAILWAY SPEED RECORDER.—Bulletin No. 263, recently issued by the Chicago Pneumatic Tool Company, illustrates and describes the Boyer railway speed recorder. The bulletin also gives instructions for applying and operating the recorder, and explains that by examining the chart which it makes, the exact speed at which the train passed any point on the road, the number and location of stops, the distance, speed and location of any backward movement that may have been made, can be determined at a glance. Several pages are devoted to the new Boyer speed recorder with clock attachment.

ARC WELDING.—This is the title of an interesting and attractive book recently issued by the Arc Welding Machine Company, New York. This company has been formed to market the materials and machinery and the welding practice which has been developed by the Electric Welding Company, organized in New York in 1908. The booklet contains data illustrated by some very interesting line drawings, showing the greater efficiency of electric arc over gas welding, particularly as to the greater concentration of the former. The methods of securing proper welding and heat treating are brought out. One section deals with electric arc control and several pages are devoted to the closed circuit system and its advantages.

Railway Construction

ALABAMA ROADS. (ELECTRIC).—The Interurban Development Company, Birmingham, Ala., has arrangements made, it is said, for financing the construction of a line from Birmingham, northwest to Jasper, about 35 miles. W. W. Shortridge, secretary, Birmingham.

APPALACHIAN RAILWAY.—Plans are being made for building an extension from Cherokee, N. C., north to Selph, four miles. Construction work on the extension is expected to be started about March 15. The company now operates a line from Ela, N. C., north to Cherokee, 6.3 miles.

BALTIMORE & OHIO.—Right of way has been secured for an extension of the tracks in the Curtis Bay section of Markley's Neck in Anne Arundel county, Md. This line has been under consideration for some time. The work will include the construction of a bridge over Curtis Creek, and the line is to be extended to the plant of the Davison Chemical Company and to connect with other industries along the shores. The extension will open a large section for industrial development. The company has also secured permission to extend its tracks from President street, Baltimore, to the waterfront at Lancaster street to connect at that point with floats carrying cars to and from the municipal tracks on Key Highway. In order to complete this project, a pier and three bridge floats will be constructed, and the car ferry formerly operated between Locust Point and President street will be resumed.

BLACK MOUNTAIN & CLINCHPORT.—Application has been made in Kentucky for a charter by this company which is backed by coal operators and coking interests of Harlan county. The company has a capital of $1,000,000 and the plans call for building from Clover Fork near Harlan, Ky., southeast through the Black mountain section of Harlan county and through Lee and Scott counties, Virginia, to Clinchport, 24 miles. The Virginia Iron, Coal & Coke Company owns much of the land through which the new line is to be built.

FLORIDA ROADS (ELECTRIC).—According to press reports, W. S. Alyea of St. Cloud, Fla., and associates have under consideration the question of building an interurban railway system radiating from St. Cloud. Capitalists of St. Joseph, Mo., are said to be interested in the project.

HILLSBOROUGH-PINELLIS INTERURBAN.—This company has secured funds from a sale of bonds, it is said, and construction work will probably be started in the near future. The plans call for building a line from Tampa, Fla., to Tarpon Springs and other points in Hillsborough county, in all about 60 miles. H. F. Winter, president; M. Caraballo, secretary, Tampa; and A. N. DePascale, engineer in charge. (September 1, page 391.)

HOUSTON, RICHMOND & WESTERN.—This company has awarded a contract to the T. S. Moore & Sons Company, Lufkin, Tex., for the construction of a line from Houston, Tex., to Garwood, approximately 26 miles. It is not known definitely when actual construction will begin.

PEAVY-WILSON (LUMBER LINE).—This company has recently incorporated for $1,000,000, and plans the construction of a new line from Longlease, La., to a connection with the Kansas City Southern near Christi, La., a distance of 55 miles. No contracts have as yet been awarded and it is not known how soon this work will commence. A. J. Peavy, president, Peavy-Wilson Lumber Company, Freeport, La.

PRINEVILLE & NORTHERN.—Bonds have been issued totaling $100,000 for the construction of a new road from Prineville, Ore., to a point 3½ miles north of Redmond, Ore., a distance of 19 miles. No contracts have as yet been awarded. H. A. Kelly, Prineville, Ore., chief engineer.

TRANS-MISSISSIPPI TERMINAL.—This company will shortly expend about $250,000 for a new train and classification yard at Westwego, La., which is about 9 miles north of New Orleans, and at which point it already has a small yard. The shops and

roundhouse now located at Gouldsboro, just across the river from New Orleans, will be reconstructed at the new yard, the roundhouse to have 15 stalls. A further improvement in the nature of a large warehouse is contemplated on the New Orleans side of the river. It has not been definitely decided when work will be started on this undertaking. J. A. Shepherd, New Orleans, La., is president and general manager.

RAILWAY STRUCTURES

BOSTON, MASS.—The Massachussetts Public Service Commission has sent to the legislature a report embracing plans for extensive changes in the structure of the elevated railway on Atlantic avenue. This report is made in response to an order made by the legislature last year which contemplates the alteration of the elevated road so as to accommodate freight traffic for a short distance. It is estimated that the proposed changes would cost $3,000,000 or more.

LOCKHART, TEX.—The Missouri, Kansas & Texas will soon begin construction of a combination freight and passenger station at an estimated cost of $15,000. No contracts have yet been awarded. L. F. Lonnbladh, chief engineer, Dallas, Tex.

ST. ANDREWS, N. B.—A contract has been given to the Deakin Construction Company, Montreal, Que., by the Canadian Pacific for constructing a building to house employees at St. Andrews. The structure will be two stories high, 32 ft. by 125 ft., of frame and stucco construction and will cost about $25,000.

ST. PAUL, MINN.—The Great Northern Terminal Company has been incorporated under the laws of Minnesota for the purpose of constructing large freight houses and the establishment of terminal yards. The terminal plan is directly in line with the new Union station project by which partially it is made necessary. The cost of buildings and yards is estimated at $2,500,000. It is planned to begin work on construction early in the spring Louis W. Hill is president of the new corporation.

SEATTLE, WASH.—The E. J. Rounds Construction Company, of Seattle, has been awarded a contract by the Northern Pacific for the construction of new terminals at Hanford street and Occidental avenue, together with a 22-stall frame roundhouse with concrete foundation, a wooden water tank, two standpipes, a score of small shop buildings and a two-track coal dock. The contract price is $150,000.

SURVEY FOR NICOLAIEVSK-ALEXEIEVSK RAILROAD.—According to the Russian press, the committee under the chairmanship of the Assistant Minister of Ways of Communications has included in the estimate for 1917 the execution of an economical and technical survey of the railroad from the city of Alexeievsk to Nicolaievsk-on-Amur.

THE RAILWAYS OF CHOSEN.—All the railways in Chosen are State owned and are controlled by the Railway Bureau of the Government General of Chosen. The total length of Chosen railways now open to traffic is 1,006 miles, of which 366 miles have been constructed since the annexation. The Seoul-Antung Line è309.7 miles) and Seoul-Fusan Line (247.9 miles) constitute the trunk line. The other lines are branches and act as feeders by bringing the trunk line into connection with important coast towns. The railways are of the 4 foot 8½-inch standard gauge, and rails weighing 76 pounds per yard in the case of the main line and 65 pounds in that of the branches.—*Commerce Report.*

AMERICAN PATENTS.—With the growth of population in the United States the number of patents issued has also greatly increased. In 1850 the number of patents issued was 993; in 1860, 4,778; in 1870, 13,333; in 1880, 13,947; in 1890, 26,292; in 1900, 26,499; in 1910, 35,930; in 1911, 34,084; in 1912, 37,731; in 1913, 35,788; in 1914, 41,850; and in 1915, 44,934. These progressive totals show that the Americans have given free scope to their inventive instincts. The number of applications for patents shows that only about two-thirds have been admitted during the last 20 years. The applications numbered 40,680 in 1895; in 1905 the total had risen to 54,971; and in 1915 it stood at 70,069. The American patent office yields respectable profits, the net receipts for the five years ended with 1915, inclusive, having been as follows: 1911, $65,698; 1912, $79,133; 1913, $137,035; 1914, $251,123, and 1915, $237,331.

Railway Financial News

BOSTON & MAINE.—The Commercial and Financial Chronicle prints the following:

"Comptroller William J. Hobbs, replying to an inquiry from the Chronicle regarding the payment of interest and rentals since the beginning of the receivership, says:

"'Briefly speaking, dividends on the stocks and interest when due on the outstanding bonds of all railroads leased to the Boston & Maine are being paid by the receiver of that company to prevent forfeiture of the leases; and also the interest on mortgage bonds assumed by the Boston & Maine, being those issued by the Worcester, Nashua & Rochester and the Portsmouth, Great Falls & Conway. The interest on the latter mentioned bonds matured December 1 and was paid.

"'The exceptions to this statement relate to the Connecticut River Railroad and the Vermont Valley Railroad, which are also in the hands of a receiver. The dividends on the Connecticut River are by the terms of the lease payable by the lessee direct to the stockholders of that road, and therefore had they not been paid there might have resulted a forfeiture of the lease. The interest on the bonds was for the same reason paid to the receiver of that road, but was held by him and not paid out to the bondholders on account of the receivership. The last interest due on the bonds of the Vermont Valley was paid on October 1, for the reason that they are mortgage bonds, and had the payment of the interest been defaulted the bonds would have matured.'"

CHICAGO, ROCK ISLAND & PACIFIC.—Another step in the reorganization of the Rock Island was taken at Chicago on Tuesday, when the holders of 20 millions of 5 per cent. gold debenture bonds were allowed to foreclose. Judge Carpenter in the Federal court directed the jury to return a verdict in favor of the Bankers' Trust Company of New York for principal and interest amounting to $21,550,513.

ERIE.—B. A. Eckhart has been elected a director, succeeding George W. Perkins, resigned.

GULF, MOBILE & NORTHERN.—This is the name of the company which has taken over the New Orleans, Mobile & Chicago after foreclosure sale. The directors of the new company are: A. H. S. Post, T. Nelson Strother, John W. Patten, Frederick W. Scott, W. H. Coverdale, J. S. Dale, J. C. Rich, W. F. Owen, Charles K. Beekman, Chauncey H. Murphy and I. B. Tigrett.

NEW ORLEANS, MOBILE & CHICAGO.—See Gulf, Mobile & Northern.

NORFOLK & WESTERN.—This company has declared the regular quarterly dividend of 1¾ per cent and an extra dividend of $1 per share on the common stock, both payable March 19 to stock of record February 28.

VALDOSTA, MOULTRIE & WESTERN.—This road has been sold to B. P. Jones, of Valdosta, Ga., for $350,000 under an order of Judge W. E. Thomas, of the Superior Court. The road runs from Valdosta, Ga., to Moultrie, a distance of 42 miles. It had been in the hands of receivers since August 23, 1913.

WABASH PITTSBURGH TERMINAL.—J. N. Wallace, chairman of the reorganization committee, announces that February 1 is the last date at which deposits or payments under the reorganization plan will be accepted. Those who do not deposit or make their payments before this date will forfeit any privileges of exchange for securities of the new company.

HOSPITAL CARS FOR CANADIAN SOLDIERS.—The Canadian Government Railway Department has decided to convert a number of passenger cars into hospital cars for the conveyance of parties of invalided soldiers returning to the Dominion from England. The cars will be equipped completely, and the fatigue and discomfort experienced by severely injured men on long land journeys will thus be considerably lessened. The work of transformation will be carried out thoroughly and with the least possible delay.